TEXTILE WORLD RECORD

SEPTEMBER, 1912

Monthly Comment.

Imports of Wool and Wool Goods

The imports of wool in June, 1912, amounted to 16,743,590 pounds, valued at $2,806,079, as compared with 9,592,848 pounds, valued at $1,475,671, in June, 1911, and 7,140,378 pounds, valued at $1,297,059 in June, 1910. This doubling of the imports of raw material indicate the healthy condition of the woolen and worsted trade at the present time. For three years business has been restricted by the agitation of the tariff question, particularly as affecting the woolen schedule. Clothiers have let their stock of goods run down and the mills have been forced to reduce production. This curtailment began unexpectedly in 1909, and, naturally, was not reflected in the wool imports until a year later. The following statement of the imports of wool for a series of years shows the shrinking in the business in 1910, and also in 1908, as a result of the panic that occurred in 1907:

Year ending June	lbs.	value
1904	173,742,834	$24,813,591
1905	249,135,746	46,225,558
1906	201,688,668	39,068,372
1907	203,847,545	41,534,028
1908	125,980,524	23,664,938
1909	266,409,304	45,171,994
1910	263,939,584	51,720,844
1911	137,647,641	23,228,005
1912	193,400,713	33,078,342

This is a substantial and gratifying increase in the demand for raw material. It is in response to a demand from a market having very light stocks of manufactured goods, and for that reason the improvement is likely to continue. The imports of wool goods for the years covered by the preceding statement were as follows:

Year ending June	
1904	$17,733,788
1905	17,893,663
1906	23,080,683
1907	22,321,237
1908	19,387,978
1909	18,102,461
1910	23,532,175
1911	18,569,791
1912	14,912,619

Australian Exports of Wool to Japan

The growth of Australian exports of wool and tops to Japan is one of the features of last year's trade. It is reported the Japanese buyers at Sydney took 50 per cent. more wool than during the previous season, and that at this market the purchases for Japan amounted to five times the quantity bought for the United States. This proportion will not be maintained for the entire Australian trade, but the increase at Sydney is a striking proof of the rapidity with which wool manufacturing is being developed in Japan. Several years ago, as noted in these columns, the Australian government established a system of subsidies for tops combed in Australia. The subsidy amounts to 1 1/2d (3 cents) a pound. As a result a flourishing tops industry has been developed at Botany, and practically the entire product of the Aus-

tralian combing mills is exported to Japan. The payment of the people's money to manufacturers to enable them to sell their products to Japan at a lower price than would otherwise be possible does not commend itself to all classes of Australians, and in a recent issue the "Sydney Mail" made known its dissatisfaction in these words:

> It should not be necessary for any Government in this country to stimulate artificially the sale of wool grown here by allowing manufacturers even in Great Britain, or on the Continent, to reap any advantage through growers, scourers, or others being encouraged to export the article by grants from the Treasury. Every ounce of wool that now goes away in the form of combed wool or tops could just as easily be disposed of in the grease or scoured—and even more easily, for the demand from the outside world for tops is limited, whereas uncombed wool is sought after eagerly by buyers from all parts of the world, and is bought for cash; whereas tops are almost invariably sold in England, France, and Germany on long credit.

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Aftermath of the Lawrence Strike

Last month the entire country was startled by the news that Ernest W. Pitman, the contractor who built the Wood and Ayer mills of the American Woolen Co., had committed suicide at his home in Andover, Mass., after having received a summons to appear before the Suffolk County grand jury investigating the planting of dynamite in Lawrence during the strike of mill operatives in that city last January. Early in the year an undertaker named J. J. Breen had been convicted of placing the dynamite in three houses in Lawrence, and fined five hundred dollars. The dynamite case was generally considered a closed incident when Pitman's suicide called attention to the investigation before the Court of Suffolk County. On August 29 the grand jury returned indictments against William M. Wood, president of the American Woolen Co., Frederick E. Atteaux, a Boston dealer in dyestuffs, and Dennis J. Collins, a dog fancier of Cambridge, Mass., charging them with having conspired with James J. Breen and Ernest W. Pitman to place dynamite on and near various dwelling houses in Lawrence. All three of the accused pleaded not guilty.

Coming as they do just when the labor leaders, Ettor and Giovanitti, are about to be tried for alleged acts leading to the killing of two persons during the Lawrence strike, these indictments subject the administration of justice in Massachusetts to a test of unusual severity. The courts are called upon to decide upon the guilt or innocence of these men, three of whom are identified with the employers of labor, while the other two are representatives of the operatives, in connection with charges growing out of a strike which is now seen to be one of the important historical events of 1912. Every good citizen may well pray that each one shall get justice; that he may be acquitted if innocent and punished if guilty. And it is the duty of everyone, particularly of the press of the country, to leave the trial of the accused to the courts, and to bear in mind that under Anglo-Saxon jurisprudence a person is considered innocent until he is proved guilty.

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Organized Short Time

In no country affiliated with the International Cotton Federation has the work of organizing been more successful than in Austria-Hungary. The cotton spinners of that country have suffered severely at times by reason both of the rise and fall of cotton prices, and this experience has been the chief incentive to organization for the purpose of regulating the price of cotton by getting cotton spinners throughout the world to restrict consumption in accordance with a prearranged plan. Another reason for the success in organizing the cotton spinners of Austria-Hungary is to be found in the ability with which the work has been managed by Arthur Kuffler, the Austrian representative of the International Federation. At a meeting of the affiliated spinners at Vienna last month over 85 per cent. of the 4,260,000 spindles in Austria-Hungary were reported as having joined the organization. It was unanimously resolved that the five-year agreement which expired on August 8 should be continued in force. It should not be forgotten, however, that the real test of short time compacts comes, not at such a time as the present, when the supply of cotton and orders for yarn are ample, but

when the supply is short and some spinners are able to operate their mills profitably because of exceptional conditions, while the remainder find it impossible to operate their machinery except at a loss.

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British Colonial Cotton

Reports of the progress in growing cotton in various colonies were recently made at a meeting of the British Cotton Growing Association. The purchases of cotton in Lagos so far this year amount to 8,643 bales, as compared with 5,129 bales for the corresponding period last year, and 5,228 bales for 1910. In Uganda cotton growing is retarded by the lack of good roads by which to bring the staple to market. Complaints are made that road construction has been stopped, but arrangements have been made for a British government loan of $2,500,000 to the East Africa and Uganda Protectorates, and it is hoped that a part of the money will be expended in building roads by which cotton can be carried from the plantations to the central markets. The exports of cotton from Uganda for the year ending March 31, 1912, amounted to 21,000 bales of 400 pounds each. In Nyasaland the weather conditions have been unfavorable, but the local authorities are making vigorous efforts to get the industry established.

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Cotton Tare

A report on cotton tare by the U. S. Commissioner of Corporations calls renewed attention to certain well known facts regarding the packing and sale of American cotton. It is not long since the State Department made a report on the same subject. Both reports were introduced to the public as being the result of an extensive investigation, and it would seem as if they supplied a striking example of the waste of public money by a duplication of work by government departments. Commissioner of Corporations Conant states that his investigation was undertaken by reason of complaints that American cotton producers were suffering heavy losses by reason of the excessive deductions for tare. The report states that these complaints are well-founded. The average cotton bale, weighing 500 pounds gross, contains 478 pounds of cotton. A deduction of 6 per cent. for tare under the cif and six contract makes the invoice net weight 470 pounds, a loss of 8 pounds of cotton on every bale. At this rate the total loss on the 10,675,445 bales of cotton exported in the year ending June, 1912, would amount to 85,403,560 pounds, the value of which at 12 cents a pound would be $10,248,427. It is to prevent this loss that extra bagging is added. Commissioner Conant says:

> The exporter naturally adds tare up to the amount allowed by the rules (roughly 26 1/2 pounds). He does this by "patching," that is, placing strip bagging on the bale. A small part of such patching is usually necessary to cover sample holes. However, since the exporter in making out his invoice must deduct 6 per cent., he frequently goes further and adds tare up to at least 6 per cent. of the total weight of the bales; sometimes he adds even more.
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> Obviously, if the exporter makes a complete adjustment in the price, and also adjusts by adding tare, he makes a profit on such added tare. If, however, complete adjustment is not made in the price, this addition of tare becomes simply a means of protection against loss, although in the trade it is usually spoken of as a "profit on patching." Granting that the price of cotton is in no way affected by the 6 per cent. rule, it is nevertheless highly objectionable. It results in changing the gross weight of the bale and thus introduces an avoidable element of chance, both as to the actual weight of cotton to be paid for and as to price.

The Commissioner concludes that the ideal remedy is the standardizing of tare to be put on each bale, making it a definite or readily ascertainable amount. Pending the adoption of the ideal remedy the Commissioner recommends that the export contract be modified so as to make the allowance for tare 5 per cent., which would more closely approximate the weight of the covering actually required to protect the cotton.

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Disease from Mildewed Warps

A disease which has recently affected a number of weavers in two mills at Colne and Burnley, England, was recently the subject of discussion in the British House of Commons. The labor member from Clitheroe asked the Home Secretary if his atten-

tion had been called to the matter and whether he would make an investigation with a view of preventing similar outbreaks in the future. In making the following reply the Home Secretary incidentally gave an illustration of the close surveillance which the British government maintains over industrial conditions:

I have received a report from the Factory Inspector on this subject. It appears that some few weeks ago certain weavers in a Burnley factory were attacked by an unusual cough, which affected the breathing. The shed in question is a dry one, ventilated by six exhaust fans, and the general conditions are good. In order to investigate the matter the firm at once called in the experts, who expressed the opinion that the outbreak was due to some mouldy sago in the "size" used in dressing the warps, causing mildew in the shed. In accordance with their advice the mill was closed and thoroughly disinfected by the local authorities. The sago is now being specially treated to prevent the development of mildew, and the warps damped by a solution of carbolic acid, with the result that a decided improvement has already taken place. A very similar outbreak occurred in a factory in Colne in the spring of 1911, which was also traced to mildew on the warps. After proper treatment and disinfection of the premises no further trouble occurred.

BUSINESS COURSES

The Boston Chamber of Commerce is taking an active interest in the support of courses on commercial and business methods to be given in Boston.

One of the courses is on commercial organization and business method, given by Prof. P. T. Cherington of Harvard University. This course studies the principles, rather than the technique, of buying and selling. It is designed to be of special value to buyers, purchasing agents, advertising men, sales managers, salesmen, office men in selling houses, and others engaged in buying and selling merchandise. To them it offers an opportunity to examine the every-day processes of purchase and sale in the light of their place in the whole field of product distribution.

The lectures in this course will be given Tuesdays and Fridays from 8 to 9 p. m. at the Women's Educational and Industrial Union, 264 Boylston St., beginning Friday, September 27, and continuing for 30 weeks. The fee is $15. Open to women as well as men.

The second course is one of exceedingly practical value to hundreds of young men and women in the employ of members of the Chamber, and to whose notice its advantages should be brought. It is on the principles of accounting and will be given by Professor Wm. M. Cole of Harvard University, who gave the same course so successfully last year that at the end of the term a petition was presented to the Extension Commission by members of the class asking for an advance course in the same subject.

This course is to be given Mondays and Wednesdays from 8 to 9 p. m. with a voluntary half hour of practice work each week, at the Harvard Medical School on Huntington Ave. The course, open to men and women, begins Monday, September 30, and will continue for 30 weeks, fee $15.

None of these courses can be given unless they receive the support of the business men in bringing them to the attention of their employes. Members who wish circulars for their employes are asked to fill out the application blank in this page and mail it to the Committee on Education.

CONGRESS OF CHEMISTS

The International Congress of Applied Chemistry held its eighth session in New York City on Sept. 6th to 13th. A large number of distinguished chemists from all quarters of the globe attended the meetings. There were several important papers presented of special interest to the textile industry. Among these was a general lecture given by Dr. William Perkin of Manchester, England, on the "Permanent Fireproofing of Cotton Goods." Dr. Perkin is a son of Sir William Henry Perkin, the discoverer of the first coal-tar dyestuff.

The Consular returns of exports from the Bradford district to the United States of America show that the value of the exports during October was $1,032,880, an increase of $793,849 compared with the corresponding month of last year. October and June rank as the only two monthly returns so far this year which have shown increases over the corresponding months of last year.

Autumn Meeting of the National Association of Cotton Manufacturers

The autumn convention of the National Association of Cotton Manufacturers on September 9th, 10th and 11th was the 93rd meeting of this old organization and one of the most interesting and best attended events in its history.

EDWIN FARNHAM GREENE, PRESIDENT OF THE NATIONAL ASSOCIATION OF COTTON MANUFACTURERS.

The selection of Hotel Griswold near New London, Conn., proved a happy choice. The hotel is first class in all its appointments and amply fitted to handle a big convention without friction and the cooperation of the management assisted in a marked degree towards the enjoyment of the occasion.

The hotel is within a stone's throw of the

river, about a quarter of a mile from the Sound so that those who cared to go either on or in the water had an opportunity.

The golf links were nearby and a large recreation field afforded opportunity for baseball and three good tennis courts were in close proximity to the hotel.

The weather was all that could be desired up to the afternoon of the last day when a fierce thunder storm drove the guests to shelter and brought the golf and tennis competitions to an abrupt ending. It furnished a grand spectacle to those who are fond of such exhibitions of nature's display.

The papers presented were of a particularly interesting character, the attendance at the business sessions was excellent and there was considerable discussion.

The athletic sports and competitions did not interfere with the business sessions, as the hours did not conflict. The success of the meeting from all points of view is the best answer to the criticism that the increasing prominence of the out-of-door and recreation features detracts from the interest of the business meetings. It is generally understood and desired by the members that the social and sporting features shall be prominent at the fall meetings and the large attendance of over three hundred registered is the best evidence of their interest and approval.

When Edwin Farnham Greene, the newly elected president, arose to open the first session on Monday evening he faced an audience that completely filled the large ball room that was used as the convention meeting place. The Association was welcomed to the State of Connecticut by Governor Baldwin and Mayor Mahan welcomed the visitors to New London.

Ex-president Franklin W. Hobbs responded to the addresses of welcome.

President Greene's opening address was an able paper touching on two topics of vital interest to cotton manufacturers at this time. It was received with marked attention and was most favorably commented on.

The feature of the president's address, as well as the subject of a number of the papers, was the personal relationship of employer and employe and the labor problem. As one speaker put it, "with the 'Humanics' rather than with the 'Mechanics' of manufacture."

This address and the papers presented at the meeting will be found on following pages.

At the close of the president's address an informal reception was held which was followed by music and dancing.

Although Tuesday morning was very warm the attendance at the business session was excellent. The expected paper from Mr. Neville, president of the New York Cotton Exchange on the "Spinning Values of Different Grades of Cotton" was not ready for presentation and was postponed until the next meeting.

The paper by Mr. Hayes on the new Lithographic Process of Cotton Printing aroused much discussion. Mr. Reoch of the Pacific Print Works submitted a paper taking issue with some of the statements made by Mr. Hayes and being unable to be present himself his paper was read by the secretary. This was followed by an interesting talk by Mr. Daniel J. Danker, who had visited the Hayes' plant in England and had sized up the proposition as it appeared to him and pointed out some of its weaknesses. President Greene had also visited the plant on his recent visit to England, from which he had returned only a few days before the meeting, and he also spoke of his impressions. The members were thus able to get first hand impressions of this interesting subject. It is regretted that Mr. Hayes was unable to be present himself to give further explanation of his process.

The interest shown in this discussion emphasized the point made by President Greene and others as to the desirability of giving greater attention to the finishing branch of the business at these meetings. It is in this direction that some of the most important developments are being made and it was pointed out that there should be the closest cooperation between the manufacturer and the converter, each studying the needs of the other with the idea of getting closer together.

The Tuesday evening session was enlivened with an interesting talk by Mr. Howson, the secretary of the International Branch of the Y. M. C. A. He suggested that if the same skill and genius that had

developed such wonderful mechanical equipment of our manufacturing industries should be devoted to the betterment of the relations between employer and employe, problems which now seem so threatening would find a happy solution. He spoke of the work that the Y. M. C. A. was doing in connection with the different industries to build up pleasanter relations and create a better atmosphere in manufacturing communities, and that they were working to develop the character of the employes and help to turn the crude foreign labor that comes to us without even the knowledge of the English language into good American citizens. He offered the practical service of the Y. M. C. A. to help in the solution of these industrial problems and hoped that the textile industry might follow the lead of several other lines of business in which cooperative work of this character had already been undertaken.

C. J. H. WOODBURY, SECRETARY OF THE NATIONAL ASSOCIATION OF COTTON MANUFACTURERS.

After the evening session, members and guests and orchestra adjourned to the grill room and with music and general good fellowship the entertainment was continued until a late hour.

At Wednesday morning's session the re-

port of the Committee on Resolutions, of which Mr. Hobbs is chairman, was presented and unanimously adopted.

This committee consisted of Messrs. Wm. M. Butler, Frederick A. Flather, Lyman D. Goff, S. Harold Greene and W. Frank Shove in addition to Mr. Hobbs, the chairman. Beside the usual resolutions of thanks for courtesies extended it was

Resolved: That this Association continues to favor the passage of reasonable workmen's compensation laws; that such laws in the various states should be as far as possible uniform in their provisions; that such laws should not comprehend any plan of compulsory insurance; that such laws should not comprehend any plan by which the state itself undertakes the business of insurance, the socialistic principle of which this association regards with disfavor.

Resolved: We continue our protests against the defective ginning and baling of American cotton as constituting the greatest economic loss of any product of this country, causing irremediable impairment of the staple and submitting an excess of foreign material which fails to protect the contents to such an extent that the recently adopted bill of lading disclaims responsibility for injury to cotton in transit; the whole system imposing upon manufacturers in the form of waste and tare an excessive amount of raw material unavailable in the production of goods.

Resolved: We submit that the American cotton crop is the only commercial form of the staple which is not prepared for shipment at the ginnery, and that the means for its suitable ginning and baling are well known as feasible and profitably available.

Resolved: We claim, in view of the excesses and variations of tare, that net cotton is the only fair basis for its merchandising, in which the practice of some other cotton manufacturing countries furnish commendable examples.

The paper on the Economic Use of Lubricating Oils was discussed at some length. Secretary Woodbury told of a test with which he was familiar showing the advantages to be gained by the liberal use of oil in minimizing friction. Mr. Bishop spoke of his experience with spindle bearings running in oil which showed no appreciable wear after very long use.

Mr. Park's paper on Humidifiers and Their Results was a comprehensive summing up of the experience of American manufacturers with humidifying apparatus and the benefits that would arrive, showing that some form of humidification was a necessary adjunct of a cotton manufacturing plant.

The fifth and last session on Wednesday evening was devoted to the discussion of new fields of cotton supply. One paper was presented showing the development made in California. Another described a species of tree cotton found in Cuba. Several bales of this cotton were on exhibition and inspected by manufacturers with much interest.

The ballot for new members at this session resulted in the following additions to the membership:

FOR ACTIVE MEMBERSHIP

William Bamber, Supt. Manhassett Mfg. Co., Putnam, Conn.
Richard Boardman, Supt. Barnard Manufacturing Co., Fall River, Mass.
Fletcher S. Brown, Supt. Warren Cotton Mills, West Warren, Mass.
W. Irving Bullard, Vice-Pres. Killingly Manufacturing Co., Danielson, Conn.
Richard H. Fish, Asst. Supt. The Esmond Mills, Esmond, R. I.
Charles H. Harding, Pres. Whitman Mills and Samoset Worsted Mills.
Joseph B. McIntyre, Treas. American Textile Co., Pawtucket, R. I.
Samuel Dunn Parker, Treas. Ipswich Mills, Boston, Mass.
Fred W. Steele, Agent Fisher Manufacturing Co., Fisherville, Mass.
J. B. Upright, Agent Saratoga Victory Manufacturing Co., Victory Mills, N. Y.
Nelson D. White, General Manager N. D. White & Sons, Winchendon, Mass.

FOR ASSOCIATE MEMBERSHIP

Frederick M. Armstrong, Fales & Jenks Machine Co., Pawtucket, R. I.
Albion L. Bucknam, American Moistening Co., Boston, Mass.
George Bradford Chadwick, Cotton Yarn Broker, Providence, R. I.
John Hill, Textile Machinery, Atlanta, Ga.
J. Carlton Howe, Vice-President Lowell Machine Shop, Lowell, Mass.
Albert L. Scott, Treasurer, Lockwood, Greene & Co.
Allan McNabb, Jr., Engineer, Lockwood, Greene & Co., Boston, Mass.
Franklin P. Shumway, Pres. F. P. Shumway Co., Boston, Mass.
Joseph J. Smith, with Wm. Firth, Boston, Mass.

President Greene is an excellent presiding officer, making graceful introductions and proving himself a ready extemporaneous speaker, and with the able assistance of the Secretary and the Committee on the Meeting, set the right tone of cordiality and made members and guests feel very much at home.

The committee consisted of Messrs. Grosvenor Ely, Chairman; George S. Barnum, E. S. Boss, W. Irving Bullard, John Eccles, R. H. I. Goddard, Jr., John E. Kendrick, Harold Lawton, James R. MacColl, Joseph Merriam, J. R. Montgomery, Walter R. Phipps and Harold C. Whitman.

It was a pleasure to all to note that Secretary Woodbury was in such good health again. His long experience has made him an expert in planning successful conventions and he received many congratulations.

The new features of the meeting were the baseball game and the tennis tournament.

The baseball game on Tuesday afternoon attracted many to the field near the hotel where the Reds and Blues battled for supremacy.

The opposing teams were made up as follows:

REDS	BLUES
Wooley c, p, 2 b	Allen p and s s
Ballou s s	Campbell 3 b
Wentworth c and 2 b	Murphy c
Bryant 3 b	Cooper c f
Wattles p and r f	Mackay l f
Bradley c f	Palmer c
Howe 1 b	Merrill 1 b
Slocum c f	Richardson p and 3 b
Stewart l f	Havey r f
Steele p and r f	Craft 2 b
	Mumford c f

Umpire Haigh with Childs on bases

They wore very attractive uniforms and showed that they were at home on the ball field. After a two-hour struggle with bat and ball, attended by a few casualities and one or two trivial errors, it was finally decided that the score was 12 to 6 in favor of the Blues and that team holds the cup offered by Fibre and Fabric for this year. The cup offered by the Pairpoint Mfg. Corporation for the best individual average goes to Frederic W. Steele, agent of the Fisherville Mfg. Co.

The golfing members found the Shennecossett Club golf course a convenient place to test their skill and on Tuesday and Wednesday afternoons the golf course was well filled. The result of the two days' competition gave the cup honor for the best gross score to George A. Ayer of Easthampton, Mass., and for the best net score to William Firth of Boston, who thus win a "leg" for the cup offered by the Board of Government.

The competition for the tennis trophies offered by Charles T. Plunkett and Henry G. Lord took the form of a doubles tournament. As this was the first time the members had the oportunity of testing their skill at tennis, the partners were drawn by lot so there would be a fair chance for all. The entries included the following pairs: Messrs. Bradley and Mitchell; Jameson and Mumford; Jackson and Hinckley; Wallace and Wooley; Chase and Campbell; Hitchcock and Steele; Slocum and Lord.

Some good matches were played and it developed that there was a good deal of real tennis talent. The final match was played on Wednesday afternoon. A heavy thunder storm prevented the finish of the match, but it had progressed far enough to determine the award of the cups to George F. Steele of the General Electric Co. and his partner E. W. Hitchcock of the Corn Products Co. of New York. It was a close contest between this pair and George Mitchell of Jones & Laughlin Co. and W. H. Bradley of the Lexington Co., Lexington, S. C. It is to be hoped that these players will have an opportunity to meet again another year.

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ADDRESS OF WELCOME TO THE STATE

By HIS EXCELLENCY, SIMEON E. BALDWIN, LL. D., Governor of Connecticut

The various national associations which meet, now in one state and now in another, play no unimportant part in the development of the American people. They help to keep us one people. They help to make the men of each part of the country know something personally of the men of every other part. They introduce every member to others who are specially interested in the things that he is also specially interested in. They stimulate investigation and discussion. They furnish a place where questions of practical politics can be examined without much reference to party platforms. I note among the subjects you are to consider are the tariff; the existing relations between foreign laborers and mill management; and workmen's compensation laws. These are present-day matters. The whole people are

talking about them, and will listen with eager ears to what you have to say. They will be disappointed if you do not treat these questions broadly, and go to the bottom of what underlies them all.

These are days of quickened popular thought; of elevated popular aspirations; of insistent popular demands. The whole world feels a new spirit of inquiry. It is looking for something new, in the way of public betterment—of the betterment of those who need it most. It is looking for the erection of higher standards of business morals, and of political morals. It sees them already rising.

The wise man does not content himself with opposing tumultuary and unreasoning currents of popular emotion, if such there are. He knows that there must be something underlying them of real significance. His part is to find out what these underlying forces are.

So you, who represent one class of the capitalists of American society, will look at these labor problems and tariff problems. You represent more than the capital invested in your mills; more than the thousands of your stockholders and bondholders. You represent a greater number of thousands who are your fellow-laborers, the wage-earners whose pay you provide, and whose interests are in large measure in your keeping.

You have, also, vital relations with the whole American people. You cannot deal with the tariff, without thinking both of what the manufacturer gets out of it, and of those out of whom he gets it.

We have got to look at these questions from all sides, if we would do justice to the inquiry; and in the long run it is justice which will be done.

We welcome the Association to the state where Eli Whitney lived, and whence he went to create by his invention of the cotton gin, the great agricultural industry of the South.

We welcome you to a manufacturing state, in which her waters were early turned into factory power, though she has long had to supplement or replace them by coal from distant states.

We welcome you to a state whose population is increasing faster than that, on the average, of the rest of the United States, and increasing because there is hardly a town without a factory.

Connecticut has passed, since the days of the Revolution, from an agricultural state to a manufacturing state.

The United States, as a whole, are moving in the same direction. The cotton factories of the South are becoming almost as important as those of the North. The farming states are growing more slowly than the manufacturing ones or, like Iowa, are growing less.

It is the law of modern life that the richest returns are from those things into which human labor enters most fully. Man is greater than his surroundings: greater than the soil he stands on. If the farmer, as time goes on, is more and more to yield his preeminence to the artisan, so much the greater is the task of those concerned, like you, in directing the artisan; so much the nobler the reward of directing him in paths of happiness and prosperity.

RESPONSE TO THE ADDRESS OF WELCOME

Mr. President:—

It is a pleasure and a privilege to me to respond in behalf of our association to the kind words of welcome from His Honor, the Mayor of New London, and from His Excellency, the Governor of Connecticut.

We are glad to be here in this interesting spot, beautiful in its natural attractions and rich with historical associations. But as has been said, we are here primarily to discuss present day matters and these problems can be solved best by meeting face to face, by learning each others view points, and by this means getting a fuller comprehension of the subjects in all their aspects. These same remarks apply also to the great national questions which are now agitating the nation from one end to the other and I believe if these problems are carefully and thoroughly discussed and understood the verdict of the people will be right, now, as it has been in the past.

The Governor naturally called attention to the fact that in this state Eli Whitney lived and it is a pleasure to recall here that this association placed a bronze tablet to his memory on the walls of the corridor of the Richmond County Court House at Augusta, Ga., a few miles from the spot where Whitney's cotton gin was first put into practical operation.

I must take issue with His Excellency on one point and that is the statement, somewhat qualified, I admit, that we "represent one class of the capitalists of American society," for as I pointed out in an address before this association a year ago, "the stockholders are composed largely of widows and orphans whose small holdings represent the savings of a lifetime and of people who by thrift and economy have saved a little money and invested it in the local mill, upon the success of which depends the very existence of the community in which it runs. The great number of stockholders in these enterprises indicates that capital is a collective noun as much as labor, and it is a well known fact that many names on the pay roll also appear on the stock ledger of the same corporation." It was further shown that 55 per centum of all the stockholders were women or trustees and that the average holding per stockholder was only 38 shares of a par value of $3.80, a great contrast to the existing popular opinion that the ownership of the textile mills is in the hands of a few wealthy people.

You are right, sir, in calling attention to the fact that we represent not only the stockholders but also the employes, with whom we are numbered. The competent manager appreciates fully his responsibilities to the stockholders and realizes he is acting as a trustee in their interest, but he none the less appreciates and realizes that in all reasonable ways he must also consider and take care of the interests of the operatives. The stockholders, the operatives and the executive must all work for the common end and all must rise or fall together. That is the true spirit of the times and the secret of real and lasting success in any enterprise.

We hear a great deal of a critical nature about trusts and combinations nowadays, and without discussing whether they are a good thing for the

country or not, it is a fact that the cotton manufacture is one of the industries in the country which is without combinations, each establishment being independent and carrying on its own business in its own way.

It is true that we represent the capital invested in cotton manufacturing but, with the exception of a very few who are members of cotton manufacturing firms, we represent it in the same manner as the most primitive type of laborer, and that is as hired men with the responsibility of faithfully attending to the duties imposed upon us.

Practically all the members of this association have advanced to positions of larger responsibility through many years of service in smaller fields of work in the same business, where were learned the various practical details pertaining to cotton manufacturing, whether they were mechanical propositions, the knowledge of raw materials and goods, or the great commercial problems which are an essential part in the success of our industry.

Napoleon made the axiom, at a time when officers had been recruited entirely from the nobility, that "every private carried a marshal's baton in his knapsack," and through the esprit de corps which that principle established, his armies won victories over greater numbers of unwilling conscripts; and in like manner, the history of the leaders in the cotton manufacturing industry shows that they were recruited from those whose early life was that of small beginnings in the cotton industry, and in these rewards to intelligence, fidelity and industry which fate has vouchsafed in the past, the history of the future may confidently be expected to repeat itself.

We are glad to be here, gentlemen, in this delightful place and amid these charming surroundings and I trust that we may so combine business and pleasure, real work and social enjoyments, that we may profit by our meeting in every way and return again to our homes mentally and physically refreshed for the winter's work.

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PRESIDENT'S ADDRESS

This is the first opportunity that I have had to publicly express my appreciation of the honor which you have bestowed upon me in electing me President of this Association. I regret very much that at the time of the April meeting I was detained in Washington on important business.

If you will pardon a few personal words,—many of you know that I have a very deep interest in the work of this Association for many reasons. In the first place, my family has now for three generations been closely identified with the cotton manufacturing industry. My grandfather starting as a carder worked up to the position of superintendent of the White Rock Mills in Rhode Island and my father prepared for Brown University while serving as an overseer in a cotton mill, and throughout his life was closely identified with the industry. From my early boyhood days the name of The New England Cotton Manufacturers' Association was a familiar one. It was therefore with peculiar pleasure that I accepted the election and consider it an honor which I cherish above most things that come to a cotton manufacturer.

I shall not attempt at this time to give any resume of events in the industry during the past few months, as I should like to devote what time I have on this occasion to the simple presentation of two subjects which I consider to be of very great importance in view of the conditions which we find surrounding us at the present moment.

First,—the general relation of the employer to employe, and second,—the effect of politics and the tariff on our industry.

In considering this most important subject of the relationship of employer and employe, I do not expect to add anything original at this time, but merely wish to call your earnest attention to the present conditions and suggest, if possible, certain lines of thought for us employers to consider with the hope that in arousing interest in this subject and directing your attention to a more careful study of these problems, the industry and the community will be freed, to a degree at least, from the serious troubles which seem to beset us in this year 1912.

We have for the past few years been considering the attitude of the public towards the corporations until now we are forced to consider more than ever before the attitude of the corporations towards their own employes. Fortunately or unfortunately, the public have had and will have a good deal to say even on this subject, as has been clearly shown in a recent strike in Boston, and the attitude of the public will have an increasing influence, in my judgment.

The fundamental conditions of our industry have not changed radically in the past few years except in the largely increased proportion of foreign-born operatives, and I venture to assert that conditions are not at all as serious as many of the present day magazines writers would have us believe.

We have heard much of late to the effect that the wage system is becoming obsolete and that the employes should own the tools and machinery with which they work. I personally believe that for practical purposes it is useless to consider any other system than the wage system. The program of the radical socialists may some day commend itself to thinking people, but this is too remote for practical consideration. While a small group of employes are advocating the abolition of the wage system, we are obliged to run our mills on the existing system, and it seems more profitable to consider means of improving it to the mutual benefit of employers and employes.

I do not believe that the employers as a whole are opposed to organizations which are working for the real good of the operatives and the community, but in this country of ambitious and liberty-loving men, limitation of wages or earnings or of the hours of work (in the case of adult men), the limitation of apprentices and the closed shop should not be tolerated. It is to the advantage of the industry, notwithstanding what outside critics may say of our attitude, to encourage the largest earnings on the part of all and to develop the individual as rapidly as possible. In some instances more sympathy and cordial cooperation are needed between the foremen and the operatives, but one of the essential principles in which we all believe is that the strictest discipline is as necessary in the factory as it is in the school, the home or the army. This is not only essential

to the success of the mill, but of the individual and the community. The question of discipline is of course one of the most serious problems of the industry where so many foreigners of diverse tongues and customs are employed, but it is nevertheless a problem which must be met and worked out successfully for the very reason that discipline is so fundamental to success. It is quite apparent in the recent troubles, not merely in the textile industry, that one result of the strikes is a lessening of discipline. We hear this on all sides. I do not mean by using the word "discipline" to suggest anything but fair, courteous treatment, but there must be the wholesome respect for law and order in the industrial organization as well as in the political organization at large.

There are two particular plans which have been suggested in recent years for encouraging the loyalty and devotion of operatives to the corporation. I refer particularly to the question of profit-sharing and pensions. I am not going to advocate either system, but merely suggest that very serious study can be given to both of these in connection with the textile industry. I know that some textile manufacturers have given very careful thought to both of these plans, and to a certain extent, have put them into effect.

The difficulty in the case of profit-sharing seems to be that the class of labor employed in the textile mills as a rule is not yet of sufficient breadth of view and intelligence to be properly stimulated by a profit-sharing plan. This is at least true of the average operative. Some few years ago, the Fall River cotton manufacturers thought, I believe, they had solved the question by fixing wages on a sliding scale, based, as I understand it, on the difference between the cost of the raw material and the price of print cloths. This was satisfactory to the employes so long as it gave them the same or increased wages, but when it resulted in the reduction of wages a new system had to be devised. I am inclined to think, therefore, that the industry has not developed to a point where any ordinary plan of profit sharing is practical, although I know some of you manufacturers will probably differ with me on this point, and I should hope to encourage a further discussion of this plan.

When it comes to the question of pensions, I think we are all inclined to feel that this is more practical. The first great objection which is raised is that of expense. Many experienced and broad-minded men do not believe that a corporation is justified in paying out the money of the stockholders for this purpose, and yet I know in the case of the railroads where the system has been introduced to a marked degree, the feeling of the executives is that it is more economical to pension their old employes rather than to keep them on the active roll when they can give only partial service at best. There is no doubt that it is to the interest of the great industrial corporations to bind to the companies by ties of loyalty as many of their operatives as possible. A pension system enables a man to work earnestly, faithfully and whole-heartedly for the interest of the company, feeling sure that he will be protected and provided for in his old age.

Another very important phase of the relationship between the mill owners and their operatives is so-called welfare work which is being carried on in many of our textile establishments. Welfare work comprises a wide range of activities, and there can be no question but that good results have been shown where the corporation has tried in a wise way to arouse the interests of operatives in the community to their personal benefit. This work has been carried on chiefly in communities where the operatives of only one corporation live in the community, and I understand that not so much has been done by the corporations themselves in large communities like Lowell, Lawrence, Fall River and New Bedford. By this I do not mean to say that the community itself is not doing in many instances a valuable work, but there is lacking the direct interest of the corporation in welfare work for its own employes. I am quite aware that even in this matter men of experience differ. Many hold the view which is based on experience that the work is not fully appreciated and does not bring a satisfactory return in the increased interest and enthusiasm of operatives, but I am inclined to feel that this is a very important means of improving the relationship with the employes, particularly where the work is carried on to a very large extent on a self-supporting basis, so that men and women can feel that the work is their own and can enter into it with a feeling of self-respect and personal interest. Much is of course being done in all large communities through a wide variety of agencies, but more can and should be done on the part of the individual companies in helping the operatives in their daily life when not actually engaged at work in the mill.

Another plan of work which is being suggested and carried into effect by some of the larger corporations is the system of resident nurses, the object being to put into each mill a competent woman who will watch closely the physical condition of the women and girls in the establishment with the idea of advising with them how to live wisely and help them in times of sickness. They are also on the spot to administer help to anyone in case of accident. Dr. Arthur T. Cabot of Boston has had this particular work very much at heart. He became interested in it particularly through his interest in the prevention and cure of tuberculosis, and felt that with this system of resident nurses in the factories, consumption could be controlled from this beginning and stamped out much more effectually. Out of this has developed the larger plan of having competent nurses to administer to all the physical needs of the women in the plants, and a great deal can be done for our work people by some such plan. It would probably not only pay the corporation from a money point of view, but will undoubtedly enable the corporation to perform a duty which perhaps many of us are overlooking.

So, with these few suggestions, I have tried to urge the importance of a careful study of these problems, believing that the necessity for careful thought is greater now than it has been for many years. Apparently the public is expecting as much of corporations as it would from individuals, and we would all agree that in our individual capacity

we should feel it not only to our advantage from a commercial point of view, but also to be our duty to take a more active interest in bringing about a cordial relation between employer and employe, and we are more than ever convinced of the seriousness of the problem when we talk with well-informed people and realize that with our profit-sharing and pensions and welfare work there is something still lacking which seems to be essential.

Although I fully appreciate that politics is an extremely dangerous thing to discuss, the political situation is of such vital importance to our industry that I shall take the liberty of saying a few words in view of our important elections this fall. I sincerely hope that our distinguished Democratic guest of the evening will take no exception to my remarks, as I am not in any way advocating the principles of any party, except in so far as they directly affect the cotton manufacturing industry.

It is perhaps unfortunate that the textile industry is so dependent on a protective tariff. Whether we shall ever be in a position to be independent of it is a question which can fairly be discussed, but, for the present at least, we are facing an inevitable tariff revision which, if done wisely, can only help the stockholders and operatives alike. On the other hand, any radical reduction which would seriously disturb the present conditions would, I sincerely believe, be most disastrous to our industry and the country at large.

It is most unfortunate that the Wool Schedule —Schedule K—has been made a foot-ball by politicians of both parties. While we here are not directly interested in this schedule, the woolen and worsted industry is akin to our own and we have looked with the greatest alarm on the widespread misrepresentation that has been the fate of this industry. Fortunately for the textile industry we have had a Tariff Board, which particularly in the case of the wool industry, made a very careful and conscientious study of the whole subject, and their report is gradually readjusting the minds of the members of Congress as well as the public at large to a saner and fairer view of the situation. While there appears to be some difference of opinion as to the fairness of the Tariff Board in its investigation of the cotton manufacturing industry, undoubtedly the work, so far as it went, was done conscientiously and fairly. The time afforded the Tariff Board for this investigation was extremely limited and it is perhaps fair to say that the investigation was not as complete as it might have been if more time had been allowed. Therefore, those of us who are inclined to take exceptions to some of their statements should seek to secure information which will extend their investigation and be prepared to present to Congress, at the proper time, a statement of all the facts relating to all branches of the industry.

Apparently there is a growing feeling in both parties that a Tariff Board of some sort can very materially aid Congress and the President in tariff matters, and I sincerely hope that, whoever is in power, justice will be done to all industries by establishing some permanent board or bureau that can in an impartial way present to Congress and the public the real facts that should influence and shape tariff changes. I hope you will all clearly understand that on this occasion I am not advocating in any way the election of any candidate for any office, but, as a representative of the cotton manufacturing industry, I sincerely appeal to all of whatever political faith, to realize that radical changes in the tariff must necessarily have a very serious effect on not only the earnings of the mills but on the earnings of the operatives themselves. I have had this opportunity, personally, to go into some of these matters quite thoroughly during the past three or four years, and I am firmly convinced that no such changes as are frequently advocated can possibly be made without resulting in great suffering to operatives and owners alike. I do not believe that anyone seriously advocates changes that would have this result, and yet it is perfectly clear that the average member of Congress, and certainly the public at large, have not the time nor opportunity to carefully study this problem. It is therefore much to be hoped that full time and consideration will be given to those who have made a serious study of the tariff in relation to our industry before anything is done. We are not opposed to reasonable changes, and we certainly are not opposed to an impartial investigation of our industry such as was made by the Tariff Board, and we welcome in every way a wider knowledge of the facts on the part of the country at large.

Although we have these two serious problems facing us which I have just been discussing, nevertheless we all believe in the continued prosperity of this country, and that the judgment of the American people in the long run is just. Yet, we who are assembled here this evening have a peculiar responsibility at this time which we cannot overlook. If we all give serious attention to these two problems, our industry will undoubtedly continue to grow and prosper.

WATER-PROOF AND DUST-PROOF MILL FLOORING

By S. W. FLESHEIM, Secretary The Master Builders' Company, Cleveland, O.

One of the most vital problems in modern mill construction is to obtain a satisfactory floor. Probably no part of the plant has to withstand more severe service; more heavy wear, and abuse, than the floor. Let me illustrate this point:

Take for comparison the roof of the mill building. This roof is contracted for and put in place. After its completion it is not called upon to withstand any service except the tax of elements and weather conditions, and yet roofs are expensive, and owners pay the price rather than have leaky roofs and unsatisfactory ones.

On the other hand—take the mill floor. When the floor comes up for consideration, the average owner does not realize the immense importance of getting a floor that will not only be in good condition when put in place, but that will withstand heavy trucking; continued walking, and hard service in every respect, for years to come. It is the intention of this paper to take up this floor problem and point out the importance of obtaining the best mill floor, with a view of enabling the

owner to get the greatest amount of value or the greatest efficiency out of every dollar spent for this purpose.

The factory floor of course has not been satisfactory, and all engineers and owners are endeavoring to find something better than anything that has yet been submitted for this purpose.

There are four classes of floors that are practical for mill use: First, wood floors; second, brick floors; third, composition floors; fourth, concrete floors.

WOOD FLOOR

The wood floor, although it has been used for a number of years with varying degrees of satisfaction, is gradually passing out of use, because: First, wood is becoming very scarce, which means

S. W. FLESHEIM.

that the wood floor is becoming prohibitive in price; second, wood is not fire-proof, thus increasing the insurance cost, which is a very large item; third, wood is unsanitary and very hard to keep clean. "These are the disadvantages of the wood floor."

COMPOSITION FLOOR

(This comprises the asphalt floor, the mastic floor, and various other compositions of saw-dust, marble, etc.)

The composition floor at the present time is prohibitive in price, costing all the way from 18 cents to 27 cents a square foot.

The composition floor is hard to install.

The average composition floor is not fire-proof because, as a rule, it must be laid over wood.

BRICK FLOOR

The next floor is the brick floor. Brick makes a good pavement, but is impractical for mill use in floors, as it is extremely hard to work on, and is also very expensive, which would make it a class not to be considered. Therefore, the serious objections which are found in every class of flooring herein discussed, makes us look for something to overcome most of these obstacles.

The ever-increasing reinforced concrete building solves the problem, by making the concrete floor possible. Let me give right here the advantages of the concrete floor: First, concrete floors are easy to lay; second, the material necessary to their construction is close at hand; third, they are inexpensive; fourth, they are absolutely fire-proof, having passed all insurance regulations. This fact means that they reduce the insurance on a building. Today the manufacturer does not want to take any unnecessary risk, and the concrete floor is the last step in making the building absolutely fire-proof; fifth, the concrete floor is sanitary. By turning a hose on the floor it may be cleaned thoroughly and cheaply; sixth, the concrete floor is vermin-proof; seventh, the concrete floor is permanent; eighth, the concrete floor if properly laid is water-proof and dust-proof.

Having illustrated the advantages of a concrete floor, I would like to point out the importance of the proper method of laying, in order to obtain floors that will fulfill all these claims.

The essentials of the concrete floor that will embody the above point, and that will give perfect and permanent service, are the following: First, first class materials, such as good, sharp, clean sand, perfectly fresh cement; second, good workmanship, meaning the services of men who understand the handling and finishing of cement; third, expert supervision. By this I mean the services of someone who understands especially the handling and finishing of floors in order that the workmen can have supervision; that the floors can be finished properly, and taken care of properly after they are finished. This means a great deal to the owner and is one of the most important points connected with the laying of concrete floors that must withstand heavy service; fourth, there is one other important point connected with the successful laying of floors that I have not as yet mentioned; this deals with the nature of concrete itself.

Concrete is inherently porous. The very materials that go into the making of concrete cause this porosity. Between each particle of sand put into the mixture there is a pore, and when the concrete has cured, if it could be seen through a magnifying glass, millions of pores would show up. This has a two-fold disadvanttage: First, this porosity leaves the concrete in such condition that water can easily seep through; second, continued wear or heavy service causes granulation, which means first, that the floor becomes very dusty, and second, it soon wears into ruts and holes of ever-increasing size; third, after the concrete floor has worn, it has, in the past been impossible to find anything that would patch it successfully.

These are the objections that have condemned the popularity and adoption of the concrete floor. These objections are today overcome. How is this done? Merely by filling these very pores which have been the vital disadvantage of concrete with an inert mineral powder, which is harder then either sand or cement; which will stand more abrasion; which increases the compressive and tensile strength of concrete.

By the addition of this material in the topping of the floor, every pore is completely filled, thereby eliminating the porosity of the mass. This means that no water can ever penetrate a

surface so treated; in other words, the surface becomes absolutely water-proof.

Furthermore, the fact that the pores are completely filled up, make the surface very dense. The result is, that it will stand extremely heavy wear for an extended time without any perceptible effect.

Now we come to the dust-proof feature of the floor. This feature is a little more intricate than any of the others. In spite of all the care contractors have taken, it seems that a large percentage of concrete floors that have been laid in the past have been very dusty, and they have not given satisfaction.

This dust comes from concrete itself, and consists of the sand and cement which is ground off, either by the heels in walking, or by the iron wheels of trucks continually passing over one place. You can readily understand that dust of this character flying around soon gets into the bearings of the machines, or into the fine fabrics, and ruins them. For this reason, it is absolutely essential that the concrete floor for mill purposes be dust-proof.

To obtain this result it is necessary to finish the surface in such a way that every superficial pore will be filled, and that a hard, dense, properly finished surface be applied, which will prevent any perceptible dust arising, and which will withstand heavy service.

Although the first cost is somewhat greater than the ordinary concrete floor, the advantages obtained by the use of this material and service would pay the owner handsomely in the long run. Remember, one shut-down necessitated by bad floor construction, will many times pay for any additional cost connected with the proper installation in the first place.

THE LITHOGRAPHIC PROCESS OF CALICO PRINTING

By J. A. JEFFERSON HAYES, Letchworth, Hertfordshire, Eng.

For generations calico printing has been carried on in this and in other countries by what is known as block printing or hand stamping, and, of late years, principally by the mechanical use of copper rollers. The former is very expensive and consequently limited in scope. The latter is the prime factor in the trade as the commercial proposition. In both instances, aniline alizarine and allied water colors are employed.

There have been no changes in the mechanical process worthy of the name for generations, and it has become an axiom that it is only possible to print calico continuously from engraved copper rollers, using aniline and allied colors. This axiom has always been encouraged by the results of numerous attempts to print calico by other processes—attempts which have invariably failed as commercial propositions.

It has, however, been possible, for many years, for lithographers to print small bits of calico, bit by bit, and each color separately, on lithographic machines, using colors based on oil; but the cost of production and the inability to print from the piece continuously prevented any development of the idea, beyond the use of this process for small fancy objects, such as small handkerchiefs, covers for chocolate boxes, and the like.

It was also found that these colors were far more permanent under exposure to light than aniline and other colors, but were inclined to be hard and cakey on the material.

It was realized by many that a possible means of obtaining faster colors lay here, and many attempts were made to produce a machine which would print calico continuously by rollers from the piece, in all colors at once, by the lithographic process; but it has always been found impossible to do so.

About ten years ago, a company was formed at Radcliffe, Lancashire, to exploit a French patent to print calico lithographically from the piece, by metal plates, each color being produced separately. While that company again demonstrated the adaptability of lithographic printing upon calico, and the greater fastness to light of the colors based on oil, it was found impossible to compete, owing to the excessive cost of this particular process and the insignificant production obtainable by the mechanical methods used.

The writer was, however, still convinced that it must be possible to produce a calico printing machine which would print continuously and in all colors at once on materials coming from the reel, by lithography, from rollers; and he started three or four years ago to work out this problem.

During this period he devoted his attention, not only to the machinery necessary, which resulted in the various patented machines employed in his process, but also made a close study of the chemical side; as a result of which a very wide and varied range of color formula have been obtained, which give highly satisfactory results in printing.

About £50,000 has been spent by himself, his partner and their associates in developing the idea, and today the Hayes (Universal) Printing Machinery, Ltd., have, at Letchworth, a completely established industry for producing printed calicos by lithography which has made a revolution in calico printing. This has necessitated the invention of many machines and appliances, in addition to the actual printing machine, and all these machines are patented, the main patents having been granted between 1907 and 1912 in twenty countries, including Great Britain, Germany and the United States of America.

The new printing machines usually print in all colors at once from metal rollers, at a speed of sixty yards a minute, and can exceed this speed; and the construction of these machines allows a change of colors and designs in a four color machine to be made in a fraction of time required in ordinary calico printing. It will, therefore, be easily understood that these new printing machines have a considerably greater production than is possible in ordinary calico printing. These new printing machines require far less power than ordinary calico printing machines, and there is not any drying arrangement on or behind these machines, as the colors do not require heat to prevent their marking off or smearing.

In most cases, after printing by the lithographic

process, the calico is merely hung and then finished. In rare instances, the printed cloth is passed through a simple bath before finishing, so that all the after processes necessary to fix or to develop aniline and allied colors disappear, and the plant required for steaming and aniline ageing is dispensed with; thereby saving the cost of both steam and labor attending thereto.

As a consequence of these great savings, the coal bill is reduced to a fraction of what is required by ordinary calico printing.

As the oil color has a natural affinity for cotton, it is not necessary to mordant the calico before printing, and the preparation of cloth, as in the old process, is omitted.

The fine art of color mixing, together with its requisite skill and expensive labor, are dispensed with, and the necessary thickenings used in the old process are no longer required.

The enormous saving in cost of production due to the omission of these several processes and to the greater production can be readily grasped.

The cost of colors is, in most styles, considerably less than that of aniline and allied colors, in some cases the same, and in a few styles somewhat more, although the writer expects to reduce the latter to the same cost. It will be understood, however, that the ordinary process could not compete with this new process, even if the colors in the new process should cost over twice the cost of aniline and allied colors. The remarkable fact of the oil colors costing so little is due to the method of their application by the lithographic process, there being practically no waste of color. Any color left in the color box is put away for use again to be utilized at any period afterwards. Where buckets of color are used in the ordinary process, only quite small tins are required in this lithographic process. This is due to the penetrative power of an oil medium, and the fact that every atom of color put on the calico remains there and that none of it is removed from the fabric.

The process is so much cleaner throughout than ordinary calico printing, that the chances of damages and rejects are reduced to a minimum. There are no doctors used on the machine.

The colors improve with age, and with rare exceptions, are quite fast to light, and have stood exposure to all weathers, during the hottest season, for four consecutive weeks, on roofs of houses in East and Central Africa. The colors, with rare exceptions, are fast to all ordinary washing, ironing, etc., and many resist soda.

The past difficulty, that these oil colors become hard and cakey on calico, has been completely overcome, and they are now as soft on calico as any other dyestuffs.

One of the most interesting developments is the absence of engraving. The designs are usually merely lithographically drawn on keyplates which are stored and kept, and when needed for use are transferred by a very simple new machine to the rollers and a perfect register obtained. The life of these designs is much greater than that of the designs on engraved copper rollers and long runs are accomplished.

After printing, the designs are at once merely washed off with acid instead of being turned off in a lathe, and it is a usual course to print from these same rollers the same day in other designs, owing to the rapidity and cheapness of washing off old designs and transferring new designs. When repeat orders come, the keyplate is taken out and the design is transferred again rapidly and at small cost, as often as required, upon the rollers. Hence the risk of sampling new designs by the lithographic process is very small, as it requires only a fraction of the expense in ordinary calico printing. There is no loss of metal in washing off designs, and hundreds of designs can be transferred one after the other upon the same roller, whose life is almost unlimited. In this process the rollers are made in standard sizes, and are secured to a fixed mandril. Their weight is thereby much reduced and greater facilities are obtained in changing the printing machines from one design to another, obviating the present system of using loose copper shells and mandrils and accomplishing great saving both of time and money. As a natural result, fewer rollers are needed, infinitely less capital is locked up in printing rollers, and there is no depreciation of metal to write off annually. This fact alone, irrespective of all the other advantages, is sufficient to make this new process a revolution of calico printing, the cost and time of lithographically drawing being a fraction of the cost and time of engraving a copper roller.

The new process produces excellent printing, clean and with sharp outlines, and the oil color tends to strengthen the calico instead of weakening it, as is the case with aniline and allied colors. Moreover, in printing with copper rollers and aniline colors, owing to the great pressure necessary between the printing roller and bowl, and the many processes after printing, there is considerable punishment and drag upon the cloth. This undesirable feature is entirely eliminated by the new process, owing to the pressure necessary for printing being very light, and to the fact that the cloth is not subjected to these after processes referred to.

Further, whereas aniline and allied colors tend to gradually disappear from the calico during the life of the material, the oil color has a constant tendency to grip the fiber of the cotton more and more and to soak into it, and actually improves during the life of the fabric.

In conclusion, calico printing hitherto has been devoted substantially to the complicated, costly, and sometimes abortive, effort to induce water colors to adhere to cotton—a palpably unnatural thing. In this new process, all these difficulties disappear, and the color is applied in a form and by means which make it natural and inevitable that it shall adhere to the cotton. The resulting revolution in calico printing should be easily understood by all.

Although this Association is assumed to be interested only in the phase of the subject applicable to calico printing, it should be said that this process is also applied to printing on other fabrics, as silk, satin, wood, jute, linoleum, oil cloth, and also to other materials, as well as to all forms of decorative printing on paper.

Although it is relatively new, the works are in full commercial operation, as is shown by the illustrations.

COMMENTS ON THE HAYES PROCESS OF LITHOGRAPHIC PRINTING

By R. A. S. REOCH, Superintendent Pacific Mills Print Works

In 1785 the method of continuous printing with engraved copper rollers was invented by a Scotchman named Thomas Bell and successfully carried out by him in Lancashire, England, and we find that by the year 1800 the new industry had been firmly established in Great Britain.

In general our criticism of these claims made for the lithographic method of printing invented by J. A. J. Hayes, of England, may be grouped under three heads: quality, quantity and economy.

Under the first head broadly speaking we would name superiority in results obtained, both as regards sharp outlines in printing, clear whites, fast colors and general excellence in finish and workmanship. No method is worthy of consideration unless it not only maintains but improves the high standard already attained. Lowering the standard of quality will not be tolerated at any price, and we are sorry to say the samples we have seen that were printed by the lithographic process are quite inferior both in delicacy of design and sharpness of outline, while the solid parts of the pattern are lacking in solidity and uniformity, presenting what printers call a mealy or broken appearance. The whites are also soiled and show innumerable little specks of color picked up from the plain parts of the aluminum tubes in printing. We believe this will be hard to overcome and is one of the great drawbacks to lithographic printing. With regard to fastness of colors we take very emphatic ground in favor of colors produced by present methods rather than those produced by lithography, and maintain they are faster to light and exposure, faster to soaping and scrubbing on washboards, faster to soda, chlorine and other chemicals, and faster to regular wear and tear. This is a question that is easily susceptible to proof.

The new colors are insoluble and are mostly lakes and pigments ground in linseed or other oils. They are applied topically to the cloth and easily rub off. In fact they closely resemble our pigment colors, used for our lowest type of printing, which requires less skill than any other class of work. By our present method of printing we can use either fast or loose colors, pigments, aniline, alizarine or indanthrene colors. We can print mordants which are not colors in themselves, but when dyed give us the fastest colors known, such as Turkey Red and similar colors. We can print resists and discharges. These and many other classes of work can be printed by methods at present in vogue, but this new process of printing is restricted to one style of work, namely, colors made from lakes and pigments ground in oil. Printers therefore need not be apprehensive that the days of calico printing are numbered. Its scope is unlimited and its field of operations even under present conditions, is continually extending.

Under the second head, quantity, we will now briefly consider production per machine, speed at which machines run, time consumed in changing colors, and change of patterns, etc. Here again we take issue with Mr. Hayes and maintain that our present printing machines can run at a higher rate of speed and turn off more and better work than can possibly be done on the new lithographic printing machines. Out statements are borne out by the testimony of lithographic printers themselves. The loss of time in changing colors is insignificant when compared to the new machines and what is true in respect to change of colors is much more so in change of patterns. Lithographic printers simply smile at these wonderful claims by Mr. Hayes. We may excuse him to some extent by remarking that in all probability his knowledge of such matters is confined to the product of English printing machines. He would perhaps change his mind were he more conversant with American methods, but in all seriousness, from what we know or can learn of the two methods of printing, it is simply preposterous to set up a claim of larger production for the new process.

We now come to the last division, economy of production, and here again we question the accuracy of Mr. Hayes' claim. In directing attention to this branch of the subject we must necessarily include the two divisions already discussed. Superior quality means higher prices, and increased production means lower costs. Indeed this question of production has more to do with cost than almost all the other items combined. Instead of engraving on copper rollers, patterns are transferred by photography and other means to aluminum tubes. The impressions taken require frequent renewal and call for the services of high priced workmen. Lithographic printers as already stated receive very high wages and skilled men of this character are difficult to obtain at any price.

To our minds the saving claimed by eliminating the processes of ageing, steaming, soaping and washing-off after printing, is more than offset by the higher priced labor and the reduced product. Much stress is laid on the amount of capital locked up in copper rolls, but do not overlook the fact that 50 per cent. of this can be obtained at any time for old copper. How much it costs for imported lithographic stone at 20 to 35 cents per pound we cannot tell, and to this must be added the cost of the aluminum plates, tubes, and the many patented machines and appliances to which Mr. Hayes refers. All this additional expense will help very materially along with 50 per cent. reduction for old copper to equalize the cost of copper rollers. Then when we take into account the extra stretch or gain in yardage obtained in running the goods through the various operations after printing, as opposed to the single process of loose hanging, the saving claimed for the new method of procedure is reduced to the vanishing point.

When we consider the fact that probably over 50 per cent. of all the goods printed in the United States by commission printers do not command more than 1 1/4 cents per yard, this including shirtings, percales, and the cheaper grades of lawns, you can readily understand that this new form of printing cannot compete at such prices. Lithographic printers are simply appalled at such low rates. Please do not misunderstand our position in this matter. If there is genuine merit in this new process, it will create a field for itself,

but on account of the low prices which prevail, I feel reasonably sure that it will not be in the regular lines of work which cover more than 75 per cent. of the entire business. Draperies would naturally be its most fitting field of operation but even here there are serious drawbacks. To print over six colors would require a very large machine which could not be operated to advantage owing to its being so complex. In addition to the feed rollers which furnish the color to the printing roller, there are a series of moistening small rollers which dampen the printing roller before it comes in contact with the color. This dampening process is just as important and perhaps more so than the application of the color itself. The antagonism of grease and water is the basic principle of lithographic printing and each individual printing roller must have its series of moistening rollers as well as its color box and color distributing rollers. On these points we need not enlarge but refer to them merely to show that this new method of printing is much more complicated than the old.

DISCUSSION ON THE HAYES PROCESS

Mr. Daniel J. Danker also spoke on this subject, saying in part:—Mr. President, I had an opportunity to see this process in England a year and a half ago. I take a few exceptions to various claims which Mr. Hayes makes. He states:

"In most cases, after printing by the lithographic process, the calico is merely hung and then finished." I think that is the weakest thing in the whole matter. As we came up through the shop we saw a lot of sheds such as a tannery would have, and these were used for loft-drying their sheetings. In talking with the people in charge the question of speeding machines was brought up. They said they could speed them up to almost any rate and they could air-dry the goods. If I was going into that process I should like to find out how much area I would require for sheds for a given production. If you are running sixty yards a minute on a printing machine you would have to have a large supplementary equipment for drying. It would take a very large area to dry the cloth. So it seems to me that this is the weakest point of all.

He speaks about eliminating "the fine art of color mixing, together with its requisite skill and expensive labor." I do not think you will ever eliminate that, unless he has some lithographic ink company that is going to mix up colors and sell them. If that is the case you are going back to the dark ages. Every company today wants to get back to the rudiments and compound their own colors to suit their own tastes and needs.

He speaks about the saving in the engraving. The most important part is the original sketch, and then there is the transferring to the lithographic stone. Lithographic engraved rolls do not give a depth of engraving. In England, where they run short runs, it may be all right to use lithographic or photographic processes, but over here we have long runs and we want depth of engraving. We want to tone them up and increase that depth, so we can run many thousands of yards. You cannot get it by lithography.

About registering—judging by the work we saw—I am giving this as a layman, but had one of the best engravers in the United States with me, even I as a layman would not consider it good work. Lithographing has made its great advance in paper, and the paper used is coated with casein so that when the lithographic stone is put on the paper the ink will not bleed or run.

He speaks of the absorbing properties of cotton. It certainly will absorb and give you comparatively blurred work. You cannot get the same clean lines as you can in printing.

He claims that the cost of colors is "in most styles considerably less than that of aniline and allied colors, in some cases the same." I do not think you can get anything as satisfactory as we are accustomed to, by this process. You cannot get the same tone of colors from pigments that you can from anilines. If you could, they would be in use today. The goods printed by this process have a rather metallic or wall-papery effect. If a woman is going to have a calico dress, she does not want colors like a billboard.

Mr. Hayes mentions about its use for draperies and tapestries. That is the only field where it would be of any use, in my opinion, where there are short runs and the absorbing does not do any harm; in fact it really makes it more artistic.

He says it is a much cleaner process and that there are no seconds. I defy any man in a print works to have no seconds.

He speaks about depth of rolls and registering and penetration. I think on a lot of those cheaper cloths the oil colors might go through, and of course you have got to let them dry and cool out there in the sheds.

I don't agree with his remarks about aniline colors disappearing from the calico trade. They will never disappear. The aniline business will be developed to a much greater extent than it has reached today. The simplicity of its use will make it always in demand. This going back to pigments and air-drying is going back fifty years.

The most important defect, however, is the drying end. What is the good of the process if you have got to have a ten-acre lot to dry your goods?

The President. This is a very interesting subject. I wish Mr. Hayes was here to explain the process further.

Mr. Daniel J. Danker. I wish he was. I would like to learn something myself. He may have made some advance in a year.

The President. Of course I have absolutely no interest in Mr. Hayes or his process, but I happened to go out to this place at Letchworth, just before I returned from England, about two weeks ago, and it is a very interesting question just what they have got there. Superficially it does look as if the process had some value, but it all depends upon the quality of the work. I do think if they can get out the quality of work—which of course is a big "IF"—if they can get out the quality of work, they can make good on some of these other claims. They claim they have a new process or were just perfecting a new process of drying

to obviate the necessity of hanging the cloth in these big sheds. To my mind that is the most serious objection—to hang all the product of any large print works in a shed would be more expensive by far than these processes which they eliminate, which are, after all, almost automatic, because they require very little handling. But this much must be said: they are going ahead and forming a company, although they have not actually raised the money and I think those of us on this side who are interested in calico printing will watch the outcome with a great deal of interest. At any rate they are turning out this cloth on a commercial scale, so I was informed. They are taking orders and turning out several thousand pieces every week at this plant, and somebody is taking it. I do not know what they are getting for it, what the commercial end of it is, but at any rate they are doing it in a small way. Instead of having lithographic printers or machine operators, whatever they are called, one man who is working on a machine is an ex-barber, and another was formerly a railway porter, and they have no practical calico printers there. The manager of the plant believes that when they get experienced calico printers to run the machines, they will do away with a great many of these imperfections. But the points that are made by Mr. Reoch and by you, Mr. Danker, are exceedingly important, and I doubt very much in my mind whether in the near future they will get a quality of work to compare with the quality of work done by the present method of printing.

Another thing—this process at best, as Mr. Reoch brings out clearly, can only turn out a small proportion of the entire product of calico print in this country. I do not know, of course, how far it may be developed, but granted that it can do all that they say, there is still a very large part of the business that must be done by present methods unless they develop this a good deal farther than it has gone.

That leads me to say, if I may be allowed, that the suggestion made by Mr. Reoch was not prompted by me in any way, in dwelling on the importance of the whole finishing end of the business. We, of course, are a society of cotton manufacturers, but of course that includes all the finishing processes, and to my mind, while there is and will always be very great interest attached to cotton manufacturing and the cotton mills themselves and all the processes and the development of those processes and the perfecting of them—to my mind the biggest single field for study and development is in the finishing of cotton goods, and I believe that the future has in store a great deal in those lines. I really wish we as an association could do more to stimulate interest in the technical side of the finishing of cotton goods, and I wish that we could have more papers and a freer discussion of some of these things that relate to the finishing end of the busines. I heartily second the suggestion made by Mr. Reoch and I hope in future meetings we shall have more papers on this side. They are of interest to us all, because, after all, even those of us who are making grey goods can only find a market through having the goods finished, either by the customer or by some printer or bleacher.

INTERNATIONAL TARIFF RELATIONS

By SAMUEL GUYTON McLENDON, B. L., 321 Kimball House, Atlanta, Ga.

In 1902 Joseph Chamberlain cried out to the countrymen of Richard Cobden: "I have not threatened the immediate disruption of the Empire, but I do not believe we can permanently keep the Empire together except upon lines which have been understood and adopted and worked upon by other countries with success. What is the remedy? Let us get rid of the chains which we ourselves have forged and which have fettered our action. Let us claim some protection like every other civilized nation."

The United Kingdom has not yet adopted the protective policy, but since 1902 all British colonies have, and they are defending themselves and supporting British commerce by their preferential tariffs. In 1911 the tariff for revenue only, or free trade party, and the protectionist party each elected two hundred and seventy-two members of parliament.

The list of articles in the French tariff, whose duties are so high as to prohibit the sale of those American articles in the market of France, could be greatly increased but it would be unnecessary. France under protection, by reason of protection, or in spite of protection, has become the greatest money lending nation in the world. The advanced statesmanship of every growing country, giving profound and accurate study to the problems of commerce, and to international tariff adjustments, has everywhere and with increasing force, abandoned the tariff-for-revenue-only doctrine, and has established the protective principle. Thirty years ago Sweden bought all of its sugar, today it produces all of its sugar. That country having lands suitable for the growth of the sugar beet, thirty years ago imposed a protective tariff on sugar, and its duty on sugar today is 1.82 cents per pound. The effect of that policy has been to turn a large amount of Swedish labor, and large sums of Swedish capital, into the cultivation of the sugar beet, and into the manufacture of beet sugar. The Swedish farmer is protected from a destruction of his industry by the foreigner, through this tariff of 1.82 cents per pound. The sugar industry of Sweden is the absolute product and creation of a protective policy, and yet the price of sugar in Sweden is controlled, not by the tariff, but is controlled on the international sugar market. Brazil a few years ago produced no rice. That country had vast areas suitable to the culture of rice, and was the buyer and consumer of 2,000,000 bags of foreign rice per annum. To encourage and protect the culture of rice, Brazil imposed an import duty of 3 cents per pound on foreign rice. The result is, that today, Brazil imports practically no rice whatever, but Brazilian capital and Brazilian labor produces all the rice needed in that republic. Brazil now keeps this money at home.

Japan, only 15 per cent. of whose soil is arable, imposes a protective tariff on rice, and yet it might buy rice at a lower price than it could produce it, from British India, Siam and China. The Japanese duty on rice was advanced 50 per cent. in 1911 for protective and not for revenue purposes. Cheaper rice might destroy his business

and then the Japanese rice grower would be unable to buy even cheap rice; hence, his government protects him with a tariff.

The Republic of Brazil charges an import duty of 7.25 cents per pound on raw cotton, which is purely a protective duty, and this is done to encourage cotton culture in Brazil. That republic imposes correspondingly high import duties on manufactures of cotton, and this is done to encourage the manufacture of cotton in Brazil, and to create a home buyer for a home product.

The writer has for several years made a study of the changing lights and shadows on this great economic problem of international commerce, as affected by international tariff relations. Every progressive country in the world is almost daily making its tariff regulations more and more protective, and more and more scientifically protective, keeping in view the subject of revenue to be derived from those articles which it cannot produce, and applying protection both to the raw commodities and to the manufactured article, according as the country had the one or both to protect. The dead and non-progressive countries of the world, on the other hand, adhere to the principle of a tariff for revenue only. In China the maximum tariff is 5 per cent. In Egypt it is 8 per cent. In British India it is 5 per cent., and in Siam 3 per cent. ad valorem.

Turn to the other countries of the world, and their tariffs are constantly increasing in the number of articles made dutiable, and constantly increasing the application of accurate and scientific knowledge in working out tariff schedules. It is often said, and almost universally believed, that the tariff is the father of the trust. This is not true. The trust is the direct offspring of unrestricted competition. Coffee, which pays no duty in the United States, the largest consumer of coffee, is said to be controlled by a trust, and yet the United States has admitted coffee free of duty for forty years. Government cannot control prices, but it can restrain and regulate that competition whose sole object is the destruction of competition. The pitiable helplessness of small capital is the meat on which this Caesar has fed. When a trust grows strong enough to dictate the price at which it will buy and the price at which it will sell, assailing it with so-called tariff revision downward, is simply pelting the trust with paper wads. In all the trials which have been held in the United States, where persons or corporations have been prosecuted for a violation of the anti-trust laws, the question of the power of the trust as based upon the tariff has never once been touched. It is the power of combination on the one hand and the defencelessness and unprotected position of the individual on the other and not the tariff, which are destroying the small and adding power to the strong. The evils are great. The consumers are mad. Their advisers are many. We are told that in the multitude of counsel there is wisdom, but we are also told that there are those who darken counsel by words without knowledge. Congress furnishes the proof of the latter proposition. The remedy is, to protect both agriculturalist and manufacturer against the foreigner by intelligently and wisely constructed protective tariffs, and to disarm the trust by legislation that will reestablish fair trade. The fair trader needs protection on two sides. On one side he needs protection from the foreigner. On the other side he needs protection from the little trust and from the big trust. The big trust is only the survivor, following in the wake of a large number of preceding smaller trusts. Under laws that would provide for fair trade, neither the big trust nor the little trust could thrive by extermination and subsequent extortion. Such laws could be enacted, as would insure fair trade, and only by such laws can the power of the trust be destroyed. So far as the tariff is concerned, this ought to be regulated only after a thorough, comprehensive and scientific investigation, and after the law making power of the country shall have been placed in possession of full information as to our international tariff relations. The trust question should be considered separate and apart from the tariff question, because when the trust becomes strong enough to make prices, it becomes strong enough in making prices to ignore tariffs, and to make prices, tariff or no tariff. This is illustrated in the case of coffee. Internal commercial peace will be established and socialism

THE TEXTILE BALL PLAYERS.

checked when Congress creates for each state a Court of Fair Trade. That court ought to be established in every state and should proceed substantially in the following way: Whenever any person, firm, company or corporation engaged in interstate commerce, or in buying and selling any article or commodity which is dealt in, in interstate commerce, shall believe that his or its business is restricted or damaged by unfair competition, said person, firm, company or corporation should have the right to invoke the aid of the Court of Fair Trade. Such person, firm or corporation should file with this Court a petition in writing, duly sworn to, setting out all the facts necessary to make out a prima facie case of unfair trade. This petition should be served upon the party complained against, and the Court should fix a day for a hearing and a place convenient and accessible. At the hearing, both sides should be fully heard in person, or by counsel, or by agent. Said Court should be required to ascertain the following facts:

First: Does the invading competitor enjoy the benefits of any law, or the benefits of membership in any association or combination not enjoyed by complainant.

Second: Would complainant's business be unfairly restricted or damaged by a continuance of the competition complained of.

Third: Would the business of complainant be destroyed by continuance of such competition.

Fourth: Would a monopoly, either local or general, be created, promoted or extended by a continuance of the business of the invading competitor.

The law should provide for the fullest and freest hearing, and should the Court find conditions of unfair trade to exist, or should find that monopoly would result, with the consequent power to advance prices arbitrarily, the court should frame such judgment in the premises, as would guarantee free trade uninterfered with by competition which would result in monopoly and higher prices.

International tariff relations, and their adjustment are commanding the attention of the highest legal, banking and commercial talent of the world. This great economic problem of international commerce is everywhere studied and acted upon with more deliberation and more accurate knowledge than in the United States. Business with us is made a pig skin bag on a political office-seeking gridiron. It is sometimes said that the tariff question ought to be settled and then let alone. It would be just as easy to enforce a law providing that there should be no more storms on land or sea. Or to enforce a law prohibiting any further religious controversy. Commerce is war, the world over. Its purpose is the acquisition of trade and riches, and until the world can come to a common agreement, there will always be commercial warfare. The world has never known but one man whose philosophy was a sure remedy for every discord, and He was born at Bethlehem. So long as success, material success, financial success, is the goal of human ambition, just so long will mankind, singly and en masse, be engaged in struggle.

THE CAUTO COTTON OF CUBA

By WILLIAM W. WHEELER, Meriden, Conn.

While in eastern Cuba, in December, 1910, at a fruit plantation near Santiago, in which I was interested, I noticed a group of trees 10 to 15 feet high, apparently bearing a crop of snowballs, and the manager informed me that it was tree cotton, and that one day when passing a wild cotton tree he grabbed off a handful and planted the seeds. These trees were the result.

This was of particular interest to me, because when a boy I commenced working in the cotton mills in my birthplace, of Moodus, Conn., and continued for several years, until I had risen to be a second hand, and later in life, while in North Carolina, for two years in connection with the

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mining industry; I became familiar with the cultivation of American cotton which was extensively raised in that region.

Returning to the subject of the Cuban cotton, I picked some of it, and brought it to Connecticut, and showed it to some of my former associates in cotton mills who had maintained their connection with the industry, and their opinions were of such a nature that I exhibited the samples to a large number of persons engaged in the cotton manufacturing business.

This cotton ranges from 1 1/8 to 1 1/4 inch staple, of a slightly yellow tint, and is strong as Sea Island cotton; being longer staple than ordinary Upland, and somewhat different in texture and color. The wild cotton trees are found in that part of Cuba, and differ a great deal in the length and character of the staple; some of it being mere down, 1/8 inch long, and from that up to the samples which I obtained.

The matter appeared so attractive to me that I planted an experimental field to prove the value of this variety of cotton, and also some of the

possibilities, as well as difficulties, which would be encountered in the cultivation of this tree cotton in a large way. Ten acres were cleared and were planted from the seed taken from the few trees already growing upon the plantation. These seeds were planted about 8 feet apart, or 1,000 trees to the acre: and although one seed was planted in a hole, there should have been three or four seeds planted and the excess should have been pulled up. Indian corn was planted between the rows of the young cotton plants for two purposes; first, to furnish shade to the young plants, and second, to prevent the growth of weeds.

These seeds were planted without being ginned, as it appeared to me that this was the manner in which nature plants cotton seeds, as the lint has a purpose in nature, perhaps to protect the seed from being destroyed by insect life; as lint cotton is not eaten by insects. This is shown in protecting trees against ants, worms, or bugs, by a rope of cotton lint wound round the trunk or branch to be protected. Also, the decaying cotton lint forms a vegetable humus to retain moisture, give nourishment, and to prevent the caking of the soil around the seed.

After the young trees had grown about 4 feet high, the tops were cut out and back to about 3 feet high, causing a vigorous side growth, giving many bearing branches, and at the same time keeping it down within reach for the purpose of picking, for a cotton tree 10 to 15 feet high the first year and growing even higher later would present difficulties in the picking of cotton in anything like the usual manner.

As there were no facilities for ginning cotton in that region, sufficient seed cotton to furnish about 1,000 pounds of lint were sent to New London, Conn., ginned, and made into two bales, which are submitted for examination.

The trees on this experimental field were trimmed and pruned, and the field weeded twice, and is now bearing the second growth, which is coming into crop, and will be ready to commence picking late in December, and will continue until about August 1.

This cotton is a perennial tree, and not, like the American cotton, an annual crop; and will continue to grow for many years. The life of the tree is not known, except that there are some of them known to be over fourteen years old. The average tree yields two to three pounds of seed cotton the first year, and fully three pounds the second year, and on the basis of this experimental field, the yield will be 2,000 pounds of seed cotton to the acre the first year, and 3,000 pounds the second year; about one-third of which is lint.

The soil is very fertile and needs only to be opened up for cultivation. It is probable that after the experience of years in cultivation, this cotton may be improved by grafting, as well as in selection of seed.

In spite of the fertility of the soil, the abundance of insect life has been one of the great obstacles to cultivation in Cuba, but none of these appear to attack the wild cotton. Columbus found cotton on the island, and as it was evidently indigenous, it appeared to me that this native cotton protected itself against the ravages of insects for ages: and was a case of the "Survival of the Fittest." Attempts to cultivate Egyptian cotton and Sea Island cotton in Cuba have not been successful, on account of the attacks of ants and other insects, and the same may be applied to my experience with Carvonica cotton from Australian seed, which I have planted here.

This cotton has been named "Cauto" cotton to distinguish it from the generality of the wild cotton upon the island.

Cuba is an intensely fertile country of about 45,000 square miles, or that of the state of Mississippi. The climate is that of the upper tropical and free from frost. There are numerous tracts of virgin land where the ground is covered with a jungle, and never cultivated by man, which can be cleared off and burned over at an expense of $25 an acre, and is then in condition for cultivation without further preparation; ploughing, harrowing, or cross-ploughing becoming unnecessary.

As near as I have been able to estimate, from my experience, the cost of this cotton is about $1.25 per hundred pounds of seed cotton, or 3 3/4 cents a pound for lint, at the plantation, and could be placed upon docks at seaboard at a cost of 6 to 8 cents a pound, less the value of the seed.

This new firm of cotton is presented to your attention as being, probably, a form of fiber which would be a valuable contribution of raw material to the cotton manufacturing world. It is quite possible that there are variations in the character of the fiber which would naturally require special attention in the mills, the same as one grade of cotton differs from another, and also that it may be especially adapted to some varieties of fabrics more than others.

It would be redundant for me to state before this Association anything in regard to the world shortage of cotton, as it is perfectly well known that cotton is the cheapest of the world's fibers used in clothing, and that its properties are becoming more and more appreciated, not merely in cotton fabrics, but also in blending with wool, making a result of lesser cost, but which maintains the protecting qualities of wool against low temperatures, and also the peculiar absorptive properties of cotton, making the blended fabrics far more comfortable to the wearer.

ECONOMIC USE OF LUBRICATING OILS

By DAVID A. COREY, S. F. Bowser & Co., Inc., Fort Wayne, Ind.

Among many others, five cases have been observed within the past few months which are of especial interest because of their size and the impression created by the figures shown. In each of these plants the methods of purchase, storage and handling are those usually employed; the oils, except naphtha which came in tank cars, being received in barrels, and stored in them, and drawn through faucets as required. Careful study by an efficiency engineer, cooperating with representatives of the concerns interested showed results as follows:

Number of Oils and Liquids Handled				
15	12	69	32	50
Total Number Gallons Used per Year				
55,150	79,000	618,696	1,715,520	353,900

Loss by Leakage, Evaporation and Non-Drainage, Plus Estimated Saving by Improved Method of Handling and Purchase				
$2,574	$3,340	$12,000	$45,634	$56,410

The large relative difference shown are in a measure due to the difference in values of materials handled, but these estimates are safe and conservative, having been made up after an intimate examination of the conditions prevailing in the five plants, and the figures used were taken from their books. In every case the analysis and statement were endorsed by representatives of the interested parties.

An important phase in oil and manufacturing economy, when the character of machinery renders possible the necessary equipment, is the re-use of oil. To re-use oil it must necessarily have all impurities that will cause damage removed, else the re-use will result in actual loss. In many plants the oil used is caught and again used on rough work, where the impurities will do no appreciable damage.

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It may seem that in such cases the loss has been well guarded against, and that any further saving would be too small to justify an investment or the spending of much time in its consideration; but lubrication economy means vastly more than the first cost, for the lubricant supplied may be entirely used up in service with virtually no waste or "drips," but this is not economical lubrication. Practice has demonstrated that there is always another item of expense besides the oil cost, and that is the cost of repairs or renewals due to injury arising from too scant lubrication, and this practice has coined the expression "sufficient lubrication."

This is a wholly inadequate and misleading term, for as commonly used it means only enough lubrication to prevent injury to the journal. It in no way measures the economy of lubrication but rather defines the limit of loss that is endurable without destroying the journal.

In modern practice the so-called "sufficient" lubrication is no longer considered adequate; flooded journals are demanded and the highest economy requires the re-use of oil. No half way provision is tenable, and if oil is to be re-used, there is no object whatever in restricting its use. The expression "the more oil you use, the less you lose" is wholly correct, for oil losses are due to destructive distillation at the journal. A greater quantity of oil produces less friction, therefore less heat and less distillation loss. The friction losses are governed to a very large extent by the quantity fed.

To secure satisfactory service in re-using oil it must be thoroughly cleansed. Old oil is not different from new if the impurities be removed. Petroleum oils never wear out, any more than water, but the lighter properties can be lost by distillation, which may occur at the temperature of an improperly lubricated journal, and to avoid this, it is necessary to keep journal temperatures low, or in other words, reduce friction by the use of large quantities of oil. The re-use of oil is now common in nearly every factory, by using ring-oiled bearings. Nobody looks upon this as much of a hazard, but if the dirty oil were taken out of the ring-oiled bearing and put into an oil cup on some other machine it would surely be looked upon as unwise and dangerous. As a matter of fact it would be both.

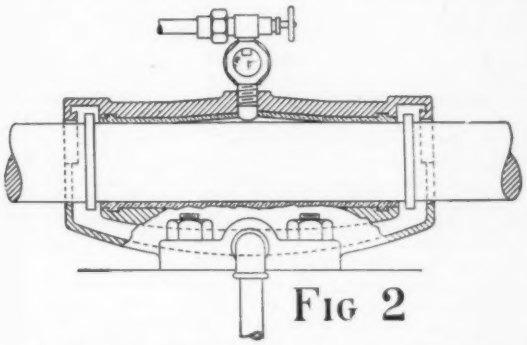


FIG 2

In the case of ring-oiled bearings, as the impurities increase in quantity they retard the flow of oil; and if the oil is not drawn off and bearings cleaned out it will cause serious cutting of the journals. This cutting may not be very plainly manifested, in fact the operator is more than likely to think that he has no trouble with his ring-oiled bearings. Furthermore, he may look upon the excessive wear as natural wear, while in fact it is due entirely to dirty oil, and consequent inability to keep the journal faces the necessary distance away from each other to permit the impurities to freely pass between. The highest lubricating efficiency, therefore, demands clean oil as well as the large quantity.

The losses due to faulty lubrication are far greater than are generally recognized.

In the power plant the friction (and consequent fuel) loss is a very conspicuous item. To reduce this loss much oil must be used, and the amount of oil used will determine the saving possible in fuel. The saving possible in the engine room is frequently of such magnitude that an investment equal to the yearly coal cost would be justified, but as a matter of fact, only about one-tenth this amount is necessary to get the best possible results. Figure 1 demonstrates more fully the value of stream fed lubrication.

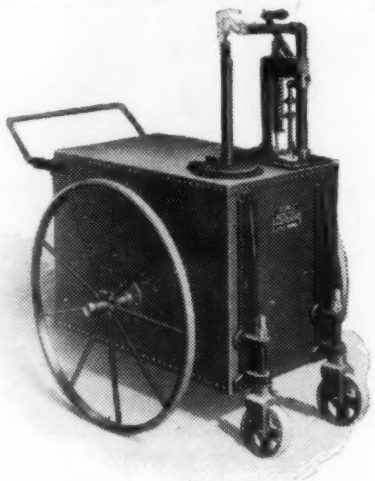
Ordinarily, two hundred times as much oil can be fed upon the journals of an engine as would be the minimum amount possible. This chart shows the different savings when feeding different quantities, and when the total, maximum saving is 5 per cent. For instance, if five gallons per hour be circulated, the saving would be 2 1/2 per cent.; if twenty gallons an hour be circulated it would effect a saving of 5 per cent., an amount which is invariably possible. The amount of oil shown in chart would be that required for a 750 h. p. engine. The use of stream fed, well filtered oil is always possible and very profitable in any engine room, paying ordinarily from 50 to 100 per cent. yearly return on the investment.

As in the preparation of this paper I have had, as collaborator, William L. Morris, M. E., I am at liberty to quote from an article written by him which appeared in the Engineering Magazine for April, 1912, entitled, "Oiling Systems That Pay 100 per Cent. Dividends."

"An oiling system that will reduce friction 5 per cent. will effect savings in one year's time sufficient to pay the entire cost of installation, and if run twenty-four hours a day it will effect even more. To secure the ultimate savings possible, it is necessary that the system be exceedingly large in all its provisions, and that it can be easily kept clean. It should be possible to clean all parts of the system while it is in service; men don't work overtime if they can avoid it, the result being that cleaning would be neglected. A 100 per cent. system cannot be obtained with less than two square feet of filtering surface for each gallon of oil filtered per hour, and the capacity should be not less than two hundred times what would be possible with a minimum hand feed. The per cent. value of a system closely approximates the amount of surface furnished and, in common with all machinery, the price does not increase as much as indicated by the quantity. If an engine room be supplied with a small system having 10 square feet of surface when it should have 100, there will be a constant yearly loss of nine-tenths the value of the larger 100 per cent. system. A sample list of savings are here tabulated, using a sample plant as an illustration:

Three 500-kilowatt engines, run 20 hours per day; average, full load, 12 hours, 300 days per year. Coal consumption, 10 pounds per kilowatt hour. Coal cost per ton, $1.80. Unloading, firing, cleaning ashes, cleaning boilers, etc., $0.40 per ton.

Coal cost per year:		
27,000 tons at $1.80		$48,600.00
Coal handling at $0.40 per ton		10,800.00
		$59,400.00
5 per cent. frictional savings		$2,970.00
24 barrels of 50 gallons at 0.15	45.00	
Oil saving		435.00
Repairs to journals	$100.00	
Repairs with system, 20 per cent.	20.00	
Saving in repairs		80.00
Shutdowns, loss of labor, materials and profit		75.00
Value of engines, etc., that would be lost when worn out, $100,000. Life by hand feed, 25 years, $4,000 per year depreciation; life by stream feed, 40 years or per year, $2,500.		
Yearly saving in depreciation		$1,500.00
20 per cent. of the time for oilers utilized for useful work. $1,200 by 20 per cent.		240.00



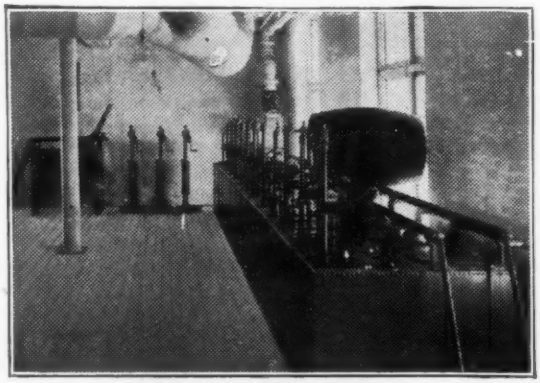
A PORTABLE OIL TANK.

Savings, occasioned by removing vibration from foundations, piping, etc., disregarded		000.00
Total savings		$5,300.00
Cost of system to effect these economies, including necessary oil guards, cups, piping and installation		$2,650.00

The figures as given show a 200 per cent. system, this being possible if plant runs as many hours as noted and other conditions being as shown. It is only in plants using refuse for fuel, or other exceptional conditions, that would not permit a 100 per cent. saving if provided with a 100 per cent. system.

The same care should be exercised in the installation of all new machinery which requires lubricated journals; for friction in the factory affects the coal pile just as much as does friction in the engine room.

Oiling systems and ring oiled bearings have come into use during the life of the present operators and have met with opposition from the start. The first obstacle was the general prejudice against re-using oil; and following this was the reluctance of manufacturers to make up new patterns suitable for the re-use of oil. Bearings for line shafts were first arranged for grease, then for wick or capillary oiling and now the use of ring, chain or collar oiling is quite general throughout the factory. The general tendency in the matter of oiling shafting is correct as all general tendencies are bound to be. Light oils in abundance are the friction savers and savers of machinery, and to make this system a perfect success it is necessary to eliminate as far as possible the re-use of dirty oil. The continuous circulation of a very



A NEW ENGLAND MILL OIL ROOM.

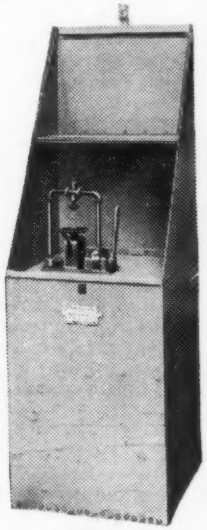
large quantity of clean light oil is the last word in lubrication: it assures the greatest benefits possible and at a cost not greater, and in most cases much less, than the poorest lubrication that will barely keep the journals from destruction. These facts being fully appreciated, it is then wholly a matter of application.

It may occur to the power user that since his machinery has not been equipped for stream fed lubrication, it would not pay in his case to arrange for such. It is doubtful if there are any such hopeless cases.

If the best practice is not obtainable, at least a far more efficient system may be employed than the existing scant or drop feed oiling, or the re-use of dirty oil. The physical conditions of the plant must determine just how perfect a system can be employed. The bearing shown in Figure 2 is one specially suited for stream feed and drips drained away, this permitting the highest possible grade of lubrication. The oil runs off the bearing and cannot be returned to it, until it has passed through a filter, and such impurities as would injure the journal removed. The collars on end of journal prevent the oil creeping along the shaft. This form (Figure 2) is as safe against shut down as any system that can be devised.

Another method of increasing the efficiency of ring, collar, or chain-oiled bearings is to occasionally wash out the bearings and supply with clean oil. This is more troublesome and not so efficient as the piped system shown in Figure 2, but it is probably the most efficient arrangement used at present for shafting, motors and the like. The great objection to this method is that so little attention is given to a journal after it has been filled with oil. Possibly once a month a little more oil is poured into the oil receptacle, and nobody ever thinks of cleaning it out. This is the use of dirty oil in its worst form. There is enough oil in the journal to keep it from melting out the Babbitt, and that is about all the good that can be said of it. It produces much friction and causes much wear of the bearings.

By observation and comparison of the power required to drive a line of shafting and the idle running machines, first with clean and then with dirty oil, and knowing the length of time this loss was endured, it can be readily determined whether it pays to change oil every month, or oftener. If the saving in power alone is equal to the labor cost it would be justified, as all other savings would be clear gain. But for heavily loaded, troublesome bearings, wherever they may be, some arrangement of flooded lubrication should be provided. If it cannot be connected to a central oiling system, then provide an individual system with possibly a rotary pump run by the machine. The re-use of a large quantity of oil is imperative wherever friction is at all noticeable, and it is safe to assume that some satisfactory arrangement can be provided. Hot or troublesome bearings are positive indications of careless or indifferent regard to operation economy. The application of grease, graphite and the like may aid, but it cannot eliminate the lubrication loss. Wherever grease is essential for operation look



DUST-PROOF OIL TANK WITH NON-OVERFLOW DISCHARGE.

closely for something wrong. Flooded journals will stand virtually any service to be met in ordinary factory service, and to provide flooded journals we must use the same oil over and over again; there is no alternative.

But little has been said in regard to the machines in the factory. If the bearings be small, requiring but little oil, and no provision has been made for flooded lubrication, it is safe generally to assume that the economies to be derived will not justify the expense and complications which would be met, but in securing new equipment an effort should be made to have stream feed or ring-oiled bearings. In many cases the hand oiler must continue, and it must, in fact, be conceded that in the textile mill the conditions are such as to make this method necessary, but many special devices for safely storing and handling have been designed as the basis for conserving the oils, to minimize the cost and assure ease and accuracy in handling, to preserve the quality, to keep the oil free from dust and lint and to reduce the fire hazard to the minimum.

The common method of distribution in mills is by means of tanks of 10 to 60 gallons capacity in the different departments, the sizes depending upon the judgment of the management; some preferring few large tanks while others prefer small tanks placed at more frequent intervals. The latter plan is very satisfactory as the small tanks can be removed from the mill for filling at the storage house outside, and in the mill are more conveniently located for the operatives.

When small tanks are used, several of them (four or six) can be transported on a truck to the storage room and returned in the same manner after filling. A tank of this kind should preferably be equipped with a non-overflow discharge, so that the oil cups can be quickly filled without spillage and without the usual accompaniment of waste which becomes saturated with oil, is thrown away, and becomes a fire menace.

Another method of distributing to tanks in the mill is by means of portable tanks, which are filled at the storage room, wheeled into the mill and the oil discharged into the permanent tanks by means of pumps.

These methods are decided improvements over the present common one of taking barrels on elevators to the different floors, rolling them through the mill to the stationary tanks and using transfer pumps or similar methods for transferring the oils from barrels to tanks. Leaky, and sometimes broken, barrels leave traces behind, and this custom is dirty and dangerous. Figure 5 offers a suggestion.

A third method and one which is being largely adopted for certain factory uses and does away with transportation about the plant, is by means of long distance pumps operated by hand or power, located at convenient points about the factory and drawing the oils from one central storage point. The advantages of this system are manifest, especially where large quantities of oils are used in manufacturing operations, and measurements of the quantity delivered is desired. In utilizing any of the plans suggested, to get the full value of the system the amounts issued to each department should be charged against that department, and to this the measuring features of the supply pumps are of great assistance. The neatness of the well-equipped central storage room, showing the elimination of barrels and the use of steel tanks without faucets or any openings in the tanks except in the tops, the oils being drawn by means of oil pumps, and certain oils stored in underground tanks and drawn by means of long distance pumps is shown in the accompanying illustration of the equipment of one New England mill.

A NEW LONG STAPLE COTTON DISTRICT

By HOWARD S. REED, El Centro, Cal.

Winner of the Thompson Trophy, Awarded the Champion Cotton Grower of the United States

I am a cotton grower and have been accused of being one of the most low down cotton farmers in America, and I cannot deny the accusation, since my farm is in a district one hundred seventy feet below the level of the sea; notwithstanding this, none of us wear diver's suits or have mermaid wives, as the ocean is kept out by a rim of mountains surrounding the valley.

HOWARD S. REED.

I am going to tell you of a country where towns are built over night; where twelve years ago, not a white man lived, where not even a Cocopah Indian or a Coyote could live on account of the total absence of water, of a country with a soil a thousand feet deep, incapable of exhaustion by man, of a country fast filling with red-blooded, virile young men, with progressiveness unchecked by the usual quota of old-timers or moss-backs, of a white man's cotton country, where there are no unprogressive black men, unwilling to adopt new modern methods or improve their strain of cotton.

From these remarks you may think I'm an optimist. I wonder if you know what an optimist is.

I will tell you if you promise not to cotton to my story. He is a man who can go home at night and brew a delightful lemonade from the "lemons" that have been handed him during the day.

It is certain that the cotton spinners of America will listen with interest to the announcement of the discovery of a new long staple cotton country. That the new country lies within the borders of our United States is the more surprising, for it has long been presumed that you know the exact boundaries of the cotton growing districts.

The new country is in every respect a second Nile Valley, lying in the extreme southwest corner of the United States, where the great Colorado River passes between Arizona and California and finds its way into the Gulf of California. There in the midst of hundreds of square miles of barren desert is a great depressed basin, below sea level and more than twice the size of the state of Rhode Island, with a soil capable of producing a bale to the acre of the most desirable cotton in the world, the American Long Staple.

CHARACTER OF SOIL

The entire Imperial Valley is composed of an alluvial silt soil deposited there when the valley was the delta of the great Colorado River, and the head of the Gulf of California. Every farmer feels that each acre he owns extends down a thousand feet in depth of the same character of soil he is tilling on the surface.

I have been asked by many how long we may continue to grow cotton without a rotation or change, and I answer by stating that we can continue just as they have done along the Egyptian Nile; our soil being the same and the fertility being kept up by constant deposits of silt spread over the ground with every irrigation, the Colorado River carrying the rich fertilizing silt in suspension in the water, of which about nine tons is deposited annually on every acre during the season's irrigating.

Our summers are long, giving us a very long growing season. The temperature is generally about 100 to 110°, with an occasional rise as high as 118°; but the atmosphere is as dry as that of the Sahara, and consequently not oppressive or as enervating as the moist heat of the Southern States.

Ours is not the country to which the fellow tried to send back for his blankets, after his departure to another world, but we have to admit that some of us are occasionally inconvenienced by discovering our hens laying hard boiled eggs.

IRRIGATION SYSTEM

There are at the present time about 250,000 acres in cultivation, supplied by 700 miles of irrigating ditches, costing $5,550,000. The supply of water is taken from the Colorado River and carried by means of a 60-mile main canal around through Lower California and back into the State of California, where the water is divided up into smaller canals spreading out over the valley on each section line.

This great irrigation system, now under the control of the Southern Pacific Railroad, supplies water cheaper than any other system in the west; the farmers paying $25 per acre share for perpetual water right, and an annual delivery rate of fifty cents per acre foot for water used; three-acre feet being the maximum amount used. An acre foot of water is sufficient water to cover one acre 12 inches deep, and is ordinarily applied at the rate of about 3 to 4 inches of water at each irrigation. There is several times as much water going to waste in the river as we are able to use.

LABOR

A large per cent. of our labor is a white labor of a superior kind, receiving from $35 to $40 per month, and board. During harvest time, large numbers of Mexicans and Japanese come into the valley. We have never experienced a shortage of cotton pickers, for the reason that our climate permits us to pick cotton from September until February of the following spring, with no rains to damage or discolor the cotton.

METHODS OF COTTON CULTIVATION

In preparing the land for cotton growing, it is plowed and thrown into ridges or beds four feet apart, and the seed drilled into the top of these beds. The water is then turned down the rows between the ridges, a small stream being used so as to permit the water to percolate down through the ground as deeply as possible. This irrigation is sufficient to cause the seed to germinate and appear above ground about the tenth day, with favorable weather. Formerly we followed the custom of irrigating the young cotton plants every ten days or two weeks, but we have lately discovered that this system of irrigation was a mistake, as it caused the young plants to form a large surface root system. We now keep the water off just as long as possible, and cause the plant to send down a long tap root without laterals and reaching down deep for the moisture below. We find the best results obtained where the water is kept off the plants until about time for the first blossoms. As the fruiting period comes on, we then have a strong deep-rooted plant to which we feed the water by irrigation every two weeks throughout the balance of the fruiting period, which continues until the last of November, when we have several light frosts. Owing to the richness of the soil and the abundance of applied moisture which is under the growers' control, the cotton gets no set-backs as in the South during hot, dry periods. Consequently, the cotton plants are much larger and more vigorous than those grown under the uncertain railfall conditions of Southern States, and we find that we must grow our plants considerably farther apart in the row. The cotton is chopped or thinned out to a distance of 18 to 22 inches. It has been the custom to cultivate with one and two horse cultivators about four times before the cotton becomes too high and is laid by.

COST OF PRODUCTION AND PROFIT

Based upon my personal experience, as well as gathering of information from our various growers, it appears that a fair etsimate of the cost of growing cotton averages about $12 per 500 pound bale, on a basis of a bale per acre. To this is added $15 for picking and $5 for baling, making the total of $32 per bale ready for shipment.

It is readily seen that we should confine our-

selves to producing only high priced long staples, and if this is done we can figure on 20 cents, or $100 per bale for our long staples. After adding $7 for the value of the seed, the gross return is $107—deducting the cost of production $32—plus $15 additional for extra cost of picking the long staple as compared to the ordinary cottons, there appears a net profit of $60 per bale.

Last year there were 11,000 acres planted. After a careful inspection of the fields through the valley, I determined that a deduction of a little in excess of 10 per cent. should be made for the field or portions of fields not cultivated and allowed to go after planting. The actual number of bales shipped then shows an average yield of one bale to the acre.

In the face of the fact that the farmers are all novices and inexperienced in cotton growing, it must be admitted that they have made a showing unequaled in any other country in the world.

It is expected that they can increase this average when they all learn how and when to apply the irrigations. Each year I have inspected the different plantations and invariably found more than half the growers had decreased their yield 25 to 50 per cent. through lack of knowledge of when and when not to apply water. They either applied too much and too frequent water during the first sixty days when the root system was being established, or else stopped irrigating too soon in the fall when the plants could have continued growing and putting on fruit for a month or six weeks. They must learn to keep them growing right up until frost.

It has recently been found that cotton growing in the south half of the valley across the boundary upon the Lower California, or Mexican side, offers some special advantages not possible on the California side, and several cotton plantations were started there this year.

Mexican and Chinese labor are available at one-half the price we pay on the California side, and there undoubtedly will be large areas put to cotton on that side next year.

PRESENT AND FUTURE MARKETS

Up to the present time our growers have received low prices for their cotton, owing to two conditions which can be changed. One is the lack of competitive buyers there on the ground, and the other, the lack of cooperation among the growers, and the hiring of expert classers to class their cottons and enable them to ship direct to Eastern brokers and buyers.

It is to be hoped that the recently organized Growers' Association will meet with the proper cooperation of the farmers, and that they will assemble their cotton at warehouses in the valley, there to be classed and shipped by the Association direct to the markets.

The farmers have also made the mistake of harvesting their crop all in one picking, instead of making two separate pickings, thereby keeping the long and short cotton separate.

Some of the crop is now sent by buyers to the Orient, some is secured by the Oakland Cotton Mills, at Oakland, Cal., and the balance of the crop goes to New Orleans by rail.

By the close of another year the Panama Canal will be completed, thereby permitting all-water shipment direct to the mills on the Atlantic Coast, which will materially reduce the present rail rate of $1.28.

Several manufacturers have asked me if there were opportunities for the establishment of cotton mills on the coast near by our valley. My answer to this question is that the time is not ripe for such an enterprise, owing to the fact that it is not possible to secure the same cheap foreign labor you do on the Atlantic coast. When the Panama Canal is completed, thousands of emigrants from the Mediterranean countries of Europe will be enabled to reach the Pacific coast by water, thereby making it possible for all manufacturing industries to avail themselves of the same priced labor you have on the Atlantic coast.

Some years ago the government established an Egyptian Cotton Breeding Farm in California on the Colorado River, also one in Arizona. By sys-

MEMBERS AND GUESTS AT THE

tematic work and aided by our extraordinary soil and climate, they are now producing an improved strain of Egyptian Cotton, far superior in length, regularity, strength and color, and have increased the yield from three hundred pounds, the average in Egypt, to seven hundred fifty pounds of lint, equaling a bale and a half per acre.

The Department of Agriculture has issued a report on growing Egyptian cotton in the southwest, which says in part: "Experiments with Egyptian cotton have been carried on during the past nine years in the southwestern United States. The results have been sufficiently good to justify the recommendation that is now to be tried on a commercial scale by farmers in the irrigated sections of southern Arizona and southeastern California. It should be definitely understood that Egyptian cotton is not a high priced speculative crop like many orchard fruits and truck crops. It is to be classed as a staple crop like grain and alfalfa, instead of being a perishable crop like citrus fruits, canteloupes or garden truck.

"Under favorable conditions and with good care it is to be expected that Egyptian cotton will yield from fifteen hundred to two thousand pounds of seed cotton per acre. At the usual rate of about twenty-eight pounds of fiber from one hundred pounds of seed cotton, a yield of eighteen hundred pounds per acre would produce a five hundred pound bale of fiber and thirteen hundred pounds of seed.

"Egyptian cotton is a special type. Its production on a large scale is at present confined to Egypt, where, during the last twelve or thirteen years, the average total crop has been approximately 600,000,000 pounds or about 1,200,000 American bales. Of this quantity an average of about 55,000,000 pounds has been exported to the United States.

"The largest item of expense is the cost of picking the crop, which is more than with upland cotton. On the other hand, the greater value of the product of the Egyptian type of cotton permits larger returns to be obtained. It is believed that the most satisfactory and profitable returns will be obtained where small acreages are planted by each family, so that the picking may be done without employing extra labor."

Understand that we are not now a Long Staple district, but are growing mostly short staple upland, some Egyptian, and just starting on long staple.

Last winter, after our country won the Grand Cotton Championship Trophy of America for the best upland cotton for yield and quality combined, I came East in behalf of my brother planters to meet some of the manufacturers and have them tell us what kind and character of cotton you wished us to grow. When I left home, I was under the impression that you would tell me that you wanted us to devote our district to Egyptian cotton exclusively.

Arriving first at New Bedford, I appeared before the Spinners' Association there, and after explaining my mission in quest of reliable information direct from the consuming manufacturers as to the proper variety of cotton for our growers to specialize on, they passed a set of resolutions urging our growers to destroy all varieties of Upland seed now on hand and start anew with a pure strain of American Long Staple; also to change the present covering of bagging to burlap, similar to that used on Egyptian bales.

COTTON MANUFACTURERS MEETING, AT THE GRISWOLD, NEW LONDON.

Upon going to Boston, I interviewed a number of manufacturers upon the same question of whether we should specialize upon Egyptian or American Long Staple. They all confirmed the opinion of the New Bedford spinners. Mr. Franklin W. Hobbs and Dr. C. J. H. Woodbury were kind enough to interest themselves in our problem and through their recommendation the Board of Government of this Association passed a set of resolutions of similar nature. The resolutions of both organizations were read and received with great interest by our people at a mass meeting of our cotton growers held April first, this year. Unfortunately, however, the good effect was minimized by one of the government's cotton men present, who had been instructed by the Department of Agriculture to boom Egyptian cotton and induce the people to grow that variety.

At this meeting, H. L. Sigourney gave a most interesting talk upon the handling of cotton, having come across the continent at the solicitation of the Long Staple Committee of New England.

The activity of this committee is being much appreciated by all the growers of our valley.

Messrs. Theophilus Parsons, H. L. Tiffany and Ronald T. Lyman, constituting this committee of the Spinners, were the first persons to take cognizance of the opportunity to develop a new long staple district in California. So quick were they to grasp the situation and act, they had within ninety days, a cotton seed breeding farm established in Imperial Valley, which is now being operated under my direction. The purpose of this farm is to make it possible for the farmers there to obtain at cost a dependable supply of acclimated, pure bred long staple cotton seed. A good strain of inch and a quarter staple was obtained from the Mississippi Delta district. By a careful system of selection of seed from the best types of plants in the field each season, a special acclimated and improved strain will be obtained. It has been a pleasant surprise to our farmers to meet with such prompt cooperation from this Committee, who did not require a season or two before acting.

Through the cooperation of Messrs. Theophilus Parsons, Frederick C. Dumaine and Franklin W. Hobbs, I have been enabled to secure the assistance of our own government in recommending to the government of Mexico the prohibition of the introduction of American cotton seed from the boll weevil districts of the United States into lower California, which is Mexican territory, except when consigned direct to a government fumigation station where it could be treated to destroy the weevil and their eggs.

I have personally offered to pay for and maintain such a station in Lower California, as one-half of our Imperial Valley lies across the border into Lower California and the other half being in the State of California. We have already passed adequate laws in that state.

By the leading manufacturers, I am informed that they can now and in the future obtain all the Egyptian cotton they may require, whether it be twelve million or twenty million dollar's worth, but they cannot obtain at home or abroad, an increased supply of American Long Staple. Unfortunately, this country in a very limited area is the only known country in the entire world which can produce it, and still more unfortuately, the boll weevil has decreased this area, capable of producing it.

PRESENT DAY RELATIONS BETWEEN THE FOREIGN BORN OPERATIVE AND THE MILL MANAGEMENT

By ARTHUR H. GULLIVER, Norwich, Conn.

It does not seem as if the United States should have been so long blind to the tremendous opportunities for securing in addition to the control of the home market their fair share of the trade which their competitors have usurped. To meet these conditions the operative class in the two countries of Germany and England are practically stationary. Class distinctions prevent change of occupation. The inherited skill and facility of manipulation which maintain in both England and Germany are very strong elements in the security with which they regard their required market.

The English cotton operative of Lancashire possesses not only his own cultivated manual and mechanical skill, but also inherits what has been bequeathed to him by generations that have been obliged by the class distinctions of the country to continue without cessation in the same employment. The Emperor of Germany has devoted the ability of his statesmen as well as his manufacturers to secure cultivated brains and muscle to acquire the skill requisite to make Germany England's most formidable competitor. Against these conditions the United States, with their inherited love of immediate attainment, have been obliged to pit the small brain and the years of grinding oppression of the immigrant class which has

ARTHUR H. GULLIVER.

flocked to our shores. Our working class is drawn from the lowest class of farm laborers.

It is useless for us to expect that conditions of thirty years ago in this country, with intelligence as well as industry the characteristics of our cotton operative, can be secured with the pauper labor of Europe, which has thronged our shores and gradually crowded the more intelligent immigrant to pursuits more congenial to his tastes and more remunerative to his purse, can be, in the short time possible between his arrival and the necessity of his earning a living wage, molded into the shape that will produce results in the operation of machinery at the same time economical, intelligent and satisfactory.

We have to face the fact that the poorly nurtured brains of these operatives of this class are to be our tools for meeting the more skilled competition of other countries. Under these conditions does it not behoove us to devote more of our time and attention to the consideration of the conditions which will produce a satisfied, contented and permanent state among the operatives whom perforce we are obliged to employ? Our southern friends have found that their unlimited reliance on the white labor of the South has been badly disturbed by the peculiar conditions which have allowed factitious prices for cotton to influence such labor in their choice of employment. It is useless to deride and ignore these condi-

tions. Our friends in this country who have chosen the poor white laborer, know from bitter experience that conditions which they themselves have produced are surely more than likely to be permanent. Each one for himself, the work they will be obliged to do to colonize and Americanize labor to meet the warmer climate and the primitive conditions of the South is our work in the North and the East and the Central States.

The decision as to the means and methods required to make our operative a live competitor of our foreign friends, will depend on local conditions that each one of us has necessarily to solve for himself. There are, however, broad considerations which the recent unfortunate, and in some cases disastrous, strikes in our own midst have brought very clearly before us; among these, the fact that we have not the chance to put off longer the decision which will meet and prevent such unfortunate occurrences in the future. The relation of the operative in a small concern to the management and ownership cannot be duplicated in concerns large enough to be commercially successful. England has solved in her own way this same problem. Her solution cannot be ours, as her conditions are widely different in all the textile industries.

Although there are, as we have already stated, no widely to be adopted rules of conduct, there are certain definite results which will have to be obtained, and the means for gaining these can be stated in general terms. At the basis of all successful work in any industry is the condition of absolute fairness between workmen and manager, a mutual understanding of the relations that each hold to one another. This can only be obtained by a change in the consideration of the human element which must enter into successful manufacture. It is absolutely necessary, whether the concern be large or small, whether its operatives are drawn largely from one nation or from various nations, that the individual should understand exactly the conditions under which he works. Whether we appreciate the fact or not, it is nevertheless true that not a few of our most unfortunate strikes have occurred from the fact that the interpretation of the language of our country is not properly conveyed to the foreigner with his different brain power and different language.

It is necessary that we employ in positions of sufficient trust and responsibility men and women who consider that the amount that they receive and the duties that they perform are sufficiently valuable to continue in our service, and who are able to interpret without misunderstanding all orders and directions given by the management that have to be carried out to the letter by each operative to insure the success of the plant. The old, trite saying that a satisfied operative is the only valuable one holds in this case perhaps as strongly as in any other.

From our experience of many years we have been obliged to increase our writing knowledge of various foreign languages. We have ceased writing elevator notices, change in time and change in wages in one language. We have been obliged to use print that would be intelligible to the French Canadian, to the Swede, to the German, and more recently to the Italian and in various other languages. Why should we pay so much attention to the minor details that are carried out on these announcements when the most important matter of all, the thorough understanding of the work which the operator performs, and of the amount and kind of remuneration he receives for the same, is absolutely necessary and should not be liable through the services of a careless and ignorant interpreter, to convey to him such a confused idea that he is unable to tell when working by the piece or by the pound either what he got off or, if he succeeds in keeping up the required production, how much he will receive.

We take the greatest of care that our force of employes shall be protected by satisfactory liability insurance from loss of employment or loss of wages caused by even minor physical injuries, and yet we leave to the mercy of chance the most important articles in our employment of each and every operative. No concern can afford either to have a temporary or continuous misunderstanding with any of its employes, no matter how small the wages nor how insignificant the duties performed. We all know to our sorrow in the past that many a successful mill has been temporarily suspended, and for some time seriously crippled by the withdrawal of the lowest paid labor. It is fully as important that the minors and low priced women in our employ as well as the dollar a day man should feel that the amount they take weekly from their envelopes should not only be what they understand we agreed to pay, but that this amount should be regular and its receipt should be certain.

We cannot expect that any concern, large or small, fully officered or run on the lowest overhead expense, can secure satisfied employes, continuous product and contented stockholders unless its operation be continuous. We have seen during the past few years the peculiar condition in which poor buying of cotton has reduced continuously successful concerns, and we have seen for many years how concerns which on account of their location and the competition for the lowest priced labor have been reduced to the direst straits by underhanded transferring of doffers, spinners and back boys by the paid agents of the different corporations who temporarily or permanently are short of this class of help.

We also require continuous employment of the same working force to meet on a fair basis the competition of our foreign competitors. We can never hope to establish in a republic a stationary class of operatives with no changes to better paid industries. The greatest security today of our mills located in the country is the fact that on account of concessions in non-essentials such as gardens, location of houses, and certain farming privileges, the regular dissatisfaction which breaks out during the spring and summer in our city mills is almost wholly prevented. We must consider, no matter what nation furnishes our help, that experience gained in the concerns over which we individually as managers preside must be the governing factor in the continued success of such plant.

We cannot expect that the trained brains as well

as hands of our higher paid foremen can be duplicated even with the strictest attention in their several callings by the average employe in their departments unless such hand remembers only the fact that he came from the ship that landed him in New York immediately to the mill, that his children have grown up in the village, have married and settled in their own homes, and a fair proportion of them continue to be employed in the same plant which has furnished him a house and steady employment for many years. This permanent employment will result in loyalty to the best interests of his employer.

Such conditions will enable us to take a loss in our general body of operatives and fill all vacancies with untrained labor, which by force of circumstances worldwide we are compelled to employ, without noting the fact, unless it is called to our attention, that we have today five different nationalities where five years ago we had but two. Gentlemen, I feel so strongly in regard to this point that I wish to emphasize the fact that our consideration, continuous and earnest, is required to so combine our suavity with our business acumen that each of us as managers and guardians of the stockholders' capital will be considered by every man, woman and child in our employ as a personal friend and counsellor whatever the exigency, whether it be sickness or death, loss of property, or change of residence. This intimate relation, which maintained for so many years in England with the guilds under whose control the various handicrafts were followed, must be duplicated in our textile plants of today. The brains and the capital of the management must be used with as much zeal for the well being of the operative as for the prizes awarded successful business enterprises by the stockholder.

It is also important for our success that we should interest even the humblest and least important of our working force in the fact that to secure permanent, steady employment they should each individually consider the value of carrying out to the most minute detail the quality of work which will insure satisfied customers and repeat orders. If they understand that success depends more on their conscientious work than the ability of the sales manager our mills can be sure of continued demand. We have heard for a great many months the shibboleth of "scientific management." We have been informed until we are almost tired of hearing it reiterated, that our government in Washington is involving itself and every citizen and resident of the wide country where we live in a continued orgy of extravagance from the fact that business as conducted in the departments is not considered at all from the standpoint of the average business man, but from the exigencies of "red tape" brought down to us hoary with age from the early days of the republic.

We have also been told that our railroads are involving the money of their stockholders, increasing the bonded indebtedness, and loading on our grandchildren the debts which we ought to pay out of dividends. All this we understand, without mentioning the names of the men who are the most energetic in emphasizing its value, could be remedied and completely obliterated by "scientific management."

What does this new watchword mean? Does it imply that the brains and the skill and experience which for so many years have enabled the citizens of the United States to surpass the world in the product of steel, in the handling of battleships, in the producing of patented inventions to save labor and time have been all these years misapplied? Are we to judge that our education of a technical grade has been so useless that we have wasted more than we have gained in our methods of applying it to every day business?

Surely this cannot be the case. To use the words of Lincoln, "it is possible to fool some of the people all the time, and all the people some of the time, but not all the people all the time." We are very much afraid with the zeal and industry which we know have been so steadily applied to make the average man believe that scientific discoveries of little moment contain the germ of future unlimited life, that we have reached the state where exploited print does not convince the man who uses his brains as well as his eyes to read the magazines and newspapers.

Scientific management we have no doubt can discover follies in any business whether textile or mercantile, as applied by the average graduate from our higher institutions of learning, but the fact of the continued success of our department stores, our railroads and steel mills shows us that perhaps the words rather than the method have been exploited by type. It is a very important matter that "scientific management" should be applied not only to the building, but the operation of every department of a good textile plant, but we are sure that such methods have been used not only within recent years, but in the past; that such methods are continually employed subject to yearly or more infrequent change as economy of space, economy of labor and economy of time demand. In this connection we all today should consider very carefully what can be done in this direction for our foreign born operative. We should consult his comfort as well as our profits in all our arrangements. Far be it from me to say here that the time has come for any brand of socialism. It may be and possibly will be in the not far distant future. If it comes we should be ready to meet it, but we can prevent and perhaps postpone the carrying out of its inconsistencies by following out a sane, reasonable and economic method of "scientific management." What does this mean? Primarily it means the economy of the only two possessions which every human being has subject to his own control, namely his time and his experience. There is nothing else, money, houses, lands or any other personal possession, that he can retain if prevented by any or all of his fellows.

These two, being universal, should be rendered by scientific management the most valuable possible to the individual operative as well as the most commercially profitable to his employer. The way in which this can be done I will not take your time and attention to particularize. In order to economize to the greatest extent the first possession, time, the building itself should be constructed to avoid any unnecessary handling of cotton in its various stages from one machine to the other. This would hold whether it was manufac-

tured in an old or in a new plant. In the old plant the competition between concerns has made it of vital importance that no building should be retained for use in any process of manufacture which common experience has rendered inadequate or too costly. By these words I mean not only the question of the actual floor space for the use of machinery, but also the various dimensions of the building, length, width and height, which changes brought about by skillful handling of our competitors have rendered obsolete. I would go as far as to advocate the bonding of an old concern which for any financial reasons was unable to call from its surplus or from the pockets of its shareholders sufficient capital to make the required changes to place such old concern on a par with its rivals.

Of course, in a new concern no association between management, ownership or engineering should involve the subscribed capital of innocent investors in any plan that would not be equal or superior in this direction to any structures that have been built in this country or abroad for the installation of the selected kinds of cotton machinery. To further economize the time it is far better to neglect the ornate and decorative features of the building than to lose sight of the more important fact that each machine should be located to require the fewest motions possible to transfer by hand the material that is being carried through the machines from minute to minute and hour to hour.

Again, in order to enlist every operative, whatever his standing on the payroll, on the side of the management and the capital they must consider that their time is not saved or the motions of their muscles decreased for the sake of lessening the amount which is put each week in their pay envelope. The exploiting by print in the lurid style followed by many of our papers any changes made to save time and labor of the operative the reporter uses to make such printed reports sensational, has too often resulted in the covert opposition of the most well meaning of our employes to any change that would decrease their labor. They would have the point so thoroughly emphasized and understood that we, as managers, should receive their most hearty cooperation in all changes which result in making their work less arduous and the time in years that they are able to be remuneratively employed lengthened and made easier.

The methods that would be followed to produce the above results we all know from our long experience are very different in different mills and different localities. We have to deal not only, as we have stated, with nationalities who have been brought up in a different environment, and whose ideas for years have been absolutely foreign to the operation of textile machinery, and who have ingrained in their nature a latent opposition to anything that is suggested by their more successful fellow men, but also the operative who has been trained by rule of thumb to follow without thought the methods pursued by his father and his grandfather. We never shall reach the position of acknowledged rivals and business competitors unless we follow to the end the conclusions that these economical operations will produce.

HUMIDIFIERS AND THEIR RESULTS

By FREDERICK W. PARKS, President The G. M. Parks Co., Fitchburg, Mass.

The invitation to read a paper on the above subject was accepted not without misgivings. That one word, "results," covers so much ground that some might interpret its use as implying careful, scientific experiment. The allotted time precluded experiments, and it is questionable if you would accept as scientific any except the broadest, covering at least more than one cotton crop, and carried on in many different mills under humidified and unhumidified conditions in the same plants. The expense of such genuine experiment obviously would be prohibitive.

Field tests, under actual running conditions, are

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admittedly better than laboratory experiments, and it is of such field tests, reported by the mill man himself, that this paper will deal.

"Artificial Humidification" (or "Humidification" as is the now generally used term) has been characterized in the past as a theory or a luxury. The theory of it has already been ably presented to you many times, so that I shall not deal with the subject from that standpoint. From the standpoint of a manufacturing luxury, I shall merely ask you to draw your own conclusions after noting the reports of field trials on various types of systems, in many different mills.

These results admittedly will not be marvels of scientific accuracy, because the information was gathered somewhat hastily and furnished gratuitously by mill men throughout the country. I feel confident that the mills who were kind enough to report were very conservative in their answers, desiring to be on the safe side rather than make a claim which could not be proven by actual figures.

These reports of field trials were obtained by

sending out a circular letter to 345 textile plants throughout this country, known to be equipped with some one or more of the various types of humidifying apparatus. This was not a complete list of all humidified mills, because such a list would be difficult to obtain, but it may be claimed to be fairly representative.

There were received eighty-one answers to this request for information, twenty-four of which were unavailable for tabulation for various reasons, fifty-seven mills sent in answers on some one or all points. These were distributed as follows:

Alabama	3	Massachusetts	15
Georgia	8	Maine	3
Louisiana	2	New Hampshire	1
North Carolina	7	New York	3
South Carolina	7	Pennsylvania	2
Tennessee	1	Rhode Island	4
Texas	1		
	29		28

The fact that twenty-nine Southern mills and twenty-eight Northern ones are included in the analysis, makes the distribution quite fair, and argues in favor of a broad acceptance of the general results. (Answers came from cotton, silk, ramie and worsted mills, cotton much predominating.)

No attempt whatever is made to differentiate between the different types of humidifying systems, the intention being to procure a statement of the generally expected results obtainable from any system of humidification, rather than to exploit in a veiled form of advertising, the particular features of any one system or its accessories. Such exploitation seems discourteous to the members and out of place here. If there be any among you who wish to hear the particular claims of merit of the various systems, it is but necessary for you to intimate that you propose to install a system of humidifiers, and I promise you that each contestant will ably present his case in your office.

The printed form accompanying the request for information read as follows:

THE INFLUENCE OF HUMIDIFIERS IN OUR MILL HAS BEEN AS FOLLOWS:

(Please give figures if possible, otherwise estimated percentages.)

1. On production
2. On floor sweeps
3. On invisible waste
4. On second quality goods
5. On static electricity
6. On broken ends in spinning
7. On loom shut downs
8. On strength of yarn or goods
9. On weight of goods
10. On mill temperature in hot weather
11. On health of operatives, good harmful unnoticed
12. The net return on the investment we estimated to be
13. Were humidifiers installed when your mill was built or did you equip later?
14. Is your equipment complete or only in some departments? If incomplete kindly state which departments are equipped

Remarks

Name of Mill

Location

QUESTION 1. — PRODUCTION

Number of answers, twenty-nine.

Ten of these claimed improvement but quoted no figures.

Nineteen gave percentages.

One ramie mill and one fine cotton mill claimed 25 per cent. increase.

One coarse cotton mill claimed 20 per cent. in card room.

Two cotton mills claimed 15 per cent. general increase.

The other fourteen mills ranged from 1 per cent. to 10 per cent. increase.

No mill reported decreased production because of the installation of humidifiers.

QUESTION 2. — FLOOR SWEEPS

Number of answers, twenty-four.

One of these claimed no improvement, though admitted in their remarks, "on the whole we have been benefited very much."

Ten claimed improvement but gave no figures.

Five admitted they really did not know from figures, but believed there had been general improvement in running conditions.

The balance claimed savings of 1 per cent. to 10 per cent., averaging around 2 per cent., although one report on card room equipment only, stated that floor sweeps had been reduced 50 per cent.

No mill reported an increase of floor sweeps because of humidifiers.

QUESTION 3. — INVISIBLE WASTE

Number of answers, seventeen.

Ten simply stated that improvement was noted. The same mill mentioned under question 2 as reporting on a card room equipment only, gave under this heading a saving of 20 per cent.

The balance reported savings of .03 per cent. to 5 per cent., and here as in other places the question arises as to whether this percentage refers to total cotton, or former amount of invisible waste. Some of the smaller percentages like .03 per cent. must obviously refer to total cotton.

No mill reported an increase of invisible waste because of humidifiers.

QUESTION 4. — SECOND QUALITY GOODS

Number of answers, seventeen.

Seven simply stated improvement, giving no figures.

Two coarse goods mills reported 25 per cent. reduction, presumably referring to former amount of seconds.

One other mentioned 15 per cent. and three mentioned 10 per cent.

The others ranged from 1 per cent. to 3 per cent.

No mill reported an increase of second quality goods.

QUESTION 5. — STATIC ELECTRICITY

Number of answers, twenty-eight.

This is a question which could hardly be answered by figures or percentages.

All mills indicated by their answers either a decided decrease or absolute prevention.

No mill reported an increase of static electricity because of humidifiers.

QUESTION 6. — BROKEN ENDS IN SPINNING

Number of answers, twenty-eight.

One yarn mill reported 50 per cent. improvement.

Six mentioned 10 per cent. improvement, while

the balance merely indicated a general improvement.

No mill reported an increase of broken ends because of humidifiers.

QUESTION 7. — LOOM SHUT DOWNS

Since all the mills replying were not cloth mills, there were but thirteen answers to this question.

One reported 25 per cent. improvement.

One reported 10 per cent. improvement.

Two reported 5 per cent. improvement.

Balance reported improvement but gave no figures.

No mill reported an increase of loom shut downs.

QUESTION 8. — STRENGTH OF YARN OR GOODS

Number of answers, twenty-four.

Three reported no improvement.

One Southern cloth mill reported 15 per cent. improvement.

One ramie mill reported 10 per cent. improvement.

One Northern gingham mill reported 5 per cent. to 10 per cent. improvement.

Three cotton mills reported 2 per cent. to 6 per cent. improvement.

Balance admitted improvement, but gave no figures.

No mill reported harmful effect.

QUESTION 9. — WEIGHT OF GOODS

Number of answers, sixteen.

Two claimed no improvement.

Two reported easier to hold goods uniform.

One cotton yarn mill reported 10 per cent.

Balance 1/2 per cent. to 6 per cent.

Possibly the fact that so few answered this question is because it is a trifle incriminating, but no mill reported loss of weight because of humidifiers.

QUESTION 10. — MILL TEMPERATURE IN HOT WEATHER

Number of answers, twenty-eight.

Fifteen of these said "cooler," "great help," etc.

Thirteen quoted degrees cooler, one case being 15°, balance ranging 5° to 10°.

One old mill equipped last fall, reported that this is the first summer they have had no trouble from their spinning room help staying out in hot weather. No mill reported an increase in temperature because of humidifiers.

QUESTION 11. — HEALTH OF OPERATIVES

Number of answers, thirty-one.

Ten of these reported "unnoticed."

Twenty-one reported "good."

None reported "bad."

These figures while not at all conclusive, are interesting in view of the agitation against artificial humidification in some quarters. Possibly the mill officials might not be the first to notice any ill effects on the health of operatives provided artificial humidification were otherwise beneficial from a manufacturing standpoint. The fact remains, however, that ordinary practice so far in this country does not demand a relative humidity so high as to be unhealthful.

The entire absence of artificial humidity during the heating season in our climate certainly permits injury to health of operatives by dust, fly, etc., which humidification to a proper extent will prevent.

QUESTION 12. — RETURN ON INVESTMENT

Only two answers to this question.

Possibly it is the hardest one on the list to answer, due to the numerous variables.

One of those answering quoted 25 per cent., the other 15 per cent. I am inclined to believe, however, that the mill quoting 15 per cent. as their return on their investment was too conservative, because this mill admitted a 5 per cent. increase in production, 10 per cent. reduction in floor sweeps, 10 per cent. reduction in broken ends, which of course effected the seconds, and further, stated that no mill can afford to be without humidifiers.

Perhaps the most comprehensive statement on this question of investment came from a Northern yarn mill, built two years ago, and equipped complete at that time. I quote as follows:

"Our invisible waste for 1911 was 1 3/4 per cent., which is very low. Our production was 93 per cent. Our regain from cotton to yarn averaged 6 per cent. on 2,000,000 pounds of cotton per year. Our humidifiers cost us $10,000."

Now 6 per cent. of 2,000,000 pounds of cotton at 10 cents a pound is worth $12,000. The system thus more than paid for itself the first year, and if you figure the saving as finished yarn instead of cotton, the investment looks all the more attractive.

QUESTION 13. — WERE HUMIDIFIERS INSTALLED WHEN YOUR MILL WAS BUILT OR DID YOU EQUIP LATER?

Number of answers, thirty-nine.

Nineteen of these were old mills, equipped after erection.

Seventeen were equippd when built.

Three were plants unequipped at first, humidified later, and additions equipped as built.

It is interesting to note that nearly half of those mills answering this question were new mills equipped when built, indicating the general thought that a new mill, in order to compete, must have every modern appliance. These new mills can, of course, give no comparative figures, as they never ran without humidifiers.

QUESTION 14. — IS YOUR EQUIPMENT COMPLETE OR ONLY IN SOME DEPARTMENTS?

Number of answers, thirty-six.

Two were equipped in weaving only.

One was equipped in carding only.

Balance reported complete equipment, which is a fair measure of the growth of the idea that a textile plant should be equipped throughout. The past few years have been a decided change in this regard. Time was when one man would equip his weaving and nothing else, another his carding and spinning, but not his weaving, the next his carding only. Each would claim his selection the proper point to apply humidity. Time is proving that each was right, for nearly every process is a drying out one on the fiber except in very favorable weather, unless artificially prevented.

This information as to field tests was obtained from mills equipped with the following systems of humidifiers:

American,	Garland,
Bell,	Hygrosso,
Bentz,	Kelley,
Carrier,	Tillotson,
Cramer,	Turbo.
Dupuis,	

Lack of space prevents the illustrating of each by cuts, but a brief description of each might read something as follows:—

The American system uses water under pressure, supplied by a pressure pump through pipes to heads distributed about the mill. Some of the water is turned into spray inside the head by impingement, the balance flowing back to the pump by gravity to be used again, while the spray emits from the casing of each head into the room.

The Bell system consists of a casing surrounding cloths stretched vertically on frames. Water, passing over the cloths, is absorbed by air from the room, blown through the casing by means of a fan located in the side of the casing and driven either by a belt or a small electric motor.

The Bentz machine blows air by means of a small fan through a chamber, the bottom part of which is filled with water. Submerged in the water is a steam coil for winter use. The air is impinged onto the surface of the water by vanes, causing a washing and mixing effect.

The Carrier system is a central humidifying plant, using the old idea of the central fan heating plant to furnish humidification alone or humidity and heat combined. The system comprises one large central fan, an air washer and humidifier, separator, heating stacks or coils and flues or ducts to distribute the air to the various rooms.

The Cramer system is similar in principle to the American, with modification as to design. The same house also markets a central fan type of installation like the Carrier. Both the Cramer and American systems furnish heads with individual fans attached to increase the air circulation, thereby increasing the capacity of the individual head.

The Dupuis humidifier is a specially designed steam valve to emit live steam into the rooms from steam pipes.

The Garland head works on the atomizer principle, similar in principle to the nasal douche. Two pipe lines are required, one for compressed air supplied by a central air compressor, and one for water not under pressure.

The Hygrosso head is operated either by belt or small motor. A portion of the water flowing upon a rapidly revolving disc is turned into spray. The water not disintegrated is drained off by gravity, while the spray is picked up by air from a fan mounted on the same shaft as the revolving disc.

The Kelley is a compressed air head, only the air and water are both under pressure, joining together and traveling in the same pipe a few feet until they come to the head itself, where atomization takes place by impingement on a small metal disc.

The Tillotson principle is that of a fan and brush within a circular casing. Water fed to the brush is disintegrated and picked up by the air from the fan. The fan and brush are both on the same shaft and may be run either by motor or belt.

The Turbo is another of the compressed air family. There are two pipe lines, one for air and one for water, and the water is not under pressure. This head works on the principle of the injector plus that of the turbine, water being lifted an inch or two out of the water pipes into the head and there pulverized by the high initial velocity of the air due to its pressure.

These comprise the list of best known humidifiers at present marketed or in use. There is certainly a wide range of principles of operation from which the possible purchaser may choose.

I shall not take your time to rehearse the history of this idea of humidification because you have all heard about it many times before:—

First, the damp climate of Lancashire, Eng., where it was thought no artificial humidity was required, then the watering pot to wet the floors, the troughs of water in the floors, the steam pots, and all that. One fact of passing interest, however, is that the mills located in that same favorable climate of England are putting in humidifiers and have been for some years. They do not need artificial humidity so many days in the year as we do, but, like a spare shoe for an automobile, when needed it is extremely useful.

To return again to the reports received from the mills, I want to quote extracts from a few of the remarks written by practical mill men:—

1. We have never kept records, but without humidifiers we could hardly walk through the card room alleys, so much good cotton was on the floor.
2. Could not run in dry weather without them.
3. On the whole benefited very much.
4. Humidifiers offset bad weather conditions. Our production increase (7 per cent.) due not only to benefit to stock in process but to improved feelings of operatives.
5. Never been without humidifiers. Would not shut them down to find out the answers to your questions.
6. Equipped from starting, therefore no method of comparison, but work runs bad when humidifiers are shut down for a short time.
7. A Massachusetts' mill writes, "enabled to maintain same production in 54 hours as 56 hours per week formerly Can start cards on high speed at once on cold mornings. It formerly took one hour to one and one-half hours to get them started."
8. Know they are a great help.
9. Consider indispensable.
10. Would not be without them for anything.
11. Believe the reason the Philadelphia section never succeeded on cotton was lack of humidifiers.
12. Great believers in humidifiers.
13. No cotton spinning mill can afford to be without.
14. Have no data but am sure work runs better.
15. Would not do without for many times their cost.

16. No data, but know for a fact humidifiers are a great value.
17. No data, but believe as important as coal to the engine.
18. No data, but no mill should be without.
19. Work all runs better.
20. More than satisfied.
21. Not run long enough to give figures but could not be without.
22. A mill without humidifiers is impossible.
23. Could not keep running without humidifiers. We use a preparation of pine oil in winter which prevents cold among the weavers and makes our weave room smell like a pine forest.
24. Could not get along without.
25. No figures, but cannot keep up production when humidifiers are stopped.
26. Would not go back to old days without humidifiers.
27. No figures, but general howl if shut off.
28. No data, but believe absolutely necessary.
29. No data, but would not think of being without.
30. Keeps dust down.

A word of thanks and appreciation is gratefully extended to those mills who kindly furnished the information from which the foregoing analysis and remarks are compiled. It is worthy of note that not one concern of the eighty-one that replied, wrote unfavorably of artificial humidification, or answered unfavorably any one of the questions asked.

One well known mill agent, in the North, told me that from his experience in several mills, he would gladly take as his salary what the books would show as a saving derived from the use of humidifiers in any fair sized mill, and he draws a good salary, too.

Gentlemen, the evidence so far as this case is concerned, is all in. The prosecution has presented its case. The defence has defaulted. There is but one verdict. There can be no other from this testimony: humidifier results are to be entered on the credit side of the ledger; there are several kinds of humidifiers, each with a sufficient number of "credits" to warrant your attention; there are several different principles involved—sufficient to satisfy you mechanically; there are a sufficient number of honorable houses in the business to satisfy your desire for competition; there are various accessories with varying degrees of importance, just as there are varying costs in installation, operation and up-keep.

Humidifiers have made it possible to operate cotton mills successfully in other sections of the country than those originally supposed to be particularly adapted to cotton manufacture. In this way humidifiers have been a valuable aid to the industry, besides improving the operating conditions of plants already favorably located.

In modern high speed textile manufacture, nothing has helped to solve so many vexatious problems, problems created by these self-same high speeds—as humidifiers; and solved them, too, without in turn becoming another problem in themselves.

Let the purchaser then study his own problem from his own particular angle. Let him select the humidifier that best solves that problem.

For while each humidifying contractor may not be sailing the same course, the destination of each is undeniably the port of "results" for the consumer.

Else, why the voyage?

SELECTION OF SITES FOR COTTON MILLS

By ALBERT L. SCOTT, Treasurer, Lockwood, Greene & Co., 93 Federal St., Boston, Mass.

Mr. Stephen Greene, whom many of you will remember as one of the greatest mill engineers the cotton industry has ever seen, once said in my presence that no single feature of a textile mill was more important than its location and none should receive earlier or more painstaking attention. The value of his opinion has often been borne in upon me, when, in my own experience I have observed the good or ill effects of location upon the fortunes of a mill. The importance of location is becoming more generally recognized as successful manufacturing grows more difficult and will continue to be of commanding interest as long as one site varies from another in operating value.

Just as in other things, there are general maxims, developed as a result of experience, which if followed will reflect favorably upon the success of the manufactory, and which, if disregarded, will tend to lessen its profits. It is the purpose of this paper to point out some of these general principles which govern the choice of cotton mill sites.

What is the object of a cotton mill? Primarily, to make money for its owners and all other considerations are generally sacrificed to that. But in addition, thought must be given not only to making money per se, but also to that more indirect form of money making, care for the health and comfort of the operatives. While not generally so considered, I believe that at bottom the underlying fundamentals of good economics and morals are one, and that a healthful mill location and comfortable conditions of working and living for the operatives will bring in profits for the mill, none the less real because they are indirect. Too frequently mills are located with too little regard to outside physical conditions, to say nothing of proper housing for the employes. Plenty of land should go with an ideal mill site. The location should be, if possible, high and sightly, so the breezes of heaven may blow over it and the last rays of sunlight reach it. These advantages are more obtainable now than formerly since in these days of electric transmission and economical steam units, sites are possible for mills which a generation ago would not have been feasible, owing to limitations of water power or water supply.

In choosing a mill site, the manufacturer must not only keep abreast of the times, but he must look into the future. As many general elements of success as possible should be centered in the mill site, so that notwithstanding changes in manufacturing conditions, the mill will contain in its location the essentials of success. To secure this a spirit of large mindedness must prevail. The management must occasionally cast its bread upon the waters and expect no return until after many days. Lack of means, especially in new mills, is a frequent cause of improper or inadequate pro-

vision for the future, but every effort should be made to so finance the mill as to provide an adequate site.

If there is one thing, therefore, that a manufacturer should be careful about, it should be to keep an open mind on the subject of mill locations. Ordinarily a corporation tries to build a new mill near its other plants, but such a course may not be best. One of the best financial ventures ever made by a mill was that made by the Pacolet Mfg. Company when it built its No. 4 mill at New Holland, Ga., a hundred and fifty miles from Pacolet. Sometimes a mill should pick up bodily and move. The old Whitfield Mills were never as successful at Newburyport as their successors the Spartan Mills have been at Spartanburg. And now to show how values of mill sites change, twenty years or more after the Whitfield Mills ceased operations, cotton manufacturing is again being successfully carried on at Newburyport. It would be interesting to know how successful the Whitfield Mills would have been, if it had remained at Newburyport until this day, with the same new equipment as its Southern successor had.

There are three features to be considered in locating a mill. One is its general location; whether in New England, New York State, the vicinity of Philadelphia, that vast cotton manufacturing empire known as the South, or some other general locality where conditions are favorable. The second is its situation in some particular town or country spot and the third is the particular and exact location on a plat of ground. It is true that the requisites of a good mill site vary from generation to generation and even from decade to decade, but in every period the three general features mentioned above must be considered even though the conditions which made a site attractive at one era might make it valueless at another.

GENERAL LOCATION

There are in this country four general locations for cotton mills. This does not mean that there are not successful mills outside these confines, but in general mills are situated in these general limits. These general sections are:

New England,
New York State,
The vicinity of Philadelphia extending to Baltimore,
The South-east.

Ordinarily speaking, if a corporation was to build a cotton mill it would be within one of the four sections named.

It may be profitable to take up in detail the first of the questions to be decided when a mill is to be located. If the new mill is to be an extension or an enlargement of an existing plant, its new location may be fixed in advance, since it may be desirable for purposes of administration to keep the properties together. But in the case of a new enterprise the relations to an established mill need not be considered.

It would seem upon first thought as if this question of general mill location should be given most painstaking thought. On the contrary I doubt whether any part of mill locating is more subject to prejudice or accident. Let us assume for a moment that a certain portion of the Mohawk Valley is the most favorable spot in the country for a knitting mill. No man who was a resident of Illinois or Tennessee would think of moving however to the Mohawk Valley to establish his knitting mill enterprise. A few years ago I journeyed over a large part of the country in company with a New England mill man and a partner in his commission house, looking for the best possible site for his particular form of cotton manufacturing. For that particular industry the general region between Knoxville and Chattanooga, Tenn., seemed on the whole the best in the country; but because of the distance from New York and the fact that the manufacturer and selling agent wished to live in New England the ideal general location was not utilized.

Formerly there were wide divergences in legal hours of labor, general legislation, wages, etc., between different grand divisions of the American cotton mill world. But the divergences are now tending to equalize. The hours of labor are no longer in South Carolina than in New England and labor lesiglation is remarkably similar in many states, both North and South. Aside from local conditions peculiar to some part of a general section, the tendency is for manufacturing conditions to approach an equilibrium. The South, owing to its warmer climate, can probably always pay less wages than New England, New York State or Philadelphia. She has secured this advantage up to the present, at least, accompanied by a lower general standard of efficiency in her plants.

It is interesting also to speculate as to why cotton manufacturing has started in some sections of the land and not in others. It is easy to see why it started in New England, but it is hard to understand why it has not assumed large proportions in a community like St. Louis. St. Louis is one of the greatest cotton and cotton goods jobbing centers in the country; for years one certain kind of cotton manufacturing, cotton bags, has been successfully carried on there; it is one of the best railroad centers in the land, labor is fairly abundant and the saving in freight on cotton to New England and on goods back to St. Louis amounts to over one cent per pound and still no cotton factory for the general trade, or finishing plant has yet been built there. Probably the reason is that no man strong enough to build a cotton mill has yet arisen in St. Louis who desired to enter this form of manufacturing. On the other hand, Baltimore, having much the same climatic conditions, poorer transportation facilities, being farther distant from the cotton fields, and having less abundant labor, has been for years a cotton manufacturing center. The explanation probably is that Baltimore provided fewer chances for business enterprise than St. Louis or most western cities and a strong man took up cotton manufacturing and other men followed in his footsteps. Why is it that Westfield makes whips or Holyoke paper or New Britain hardware. Not because these communities were particularly suited to the industry prominent in them, but because the general conditions in the locality were favorable and some man who knew how to make whips

lived in Westfield, someone who knew paper lived in Holyoke and an iron maker started operations in New Britain. Lynn became a shoe center apparently for no other reason than because a Welshman, John Adam Dagyr, in 1750, dissected some French shoes, copied them and taught others how to make them. Lynn was a fishing community and a great many skilled cordwainers lived there. Being skilled in manual dexterity they easily took up shoe making and so a great industry was started at that point.

These illustrations could be indefinitely multiplied in cotton manufacturing as well as in other industries. It seems clear that the decision as to the general locality may be very largely a matter of personal preference or of accident, although now with the development of the industry the limits of the general sections of the country where cotton manufacturing is, in a large way carried on, are fairly clearly defined.

The decision as to the general location once made, however, the manufacturer cannot entirely humor his fancy as to the kind of goods he will make. One would hardly choose Baltimore to manufacture fine goods, nor New Bedford to make duck, although undoubtedly the goods mentioned may be made at either place. But in general, the similar types of cotton manufacturing tend to go together as is evidenced in such manufacturing centers as Fall River or La Grange, Ga., or New Bedford.

For certain classes of goods, nearness to the seashore is advanced as an advantage on account of natural humidity thus secured. This argument does not appear very important, however, since artificial humidification has become so highly developed an art.

In general, certain communities seem to be adapted to certain lines of manufacturing probably because the town started making some particular class of goods. Once started, the tendency was to continue to make the goods with which the employes were familiar.

LOCATION IN A PARTICULAR TOWN OR COUNTRY SITE

The second feature of mill location is placing it in some particular town or community after its general location has been determined. There is more elasticity of thinking in this part of mill location than in the former. A Southern manufacturer residing in Spartanburg, let us say, might forego operating a mill in that particular city in his general section, if conditions were more favorable in Georgia, but he would hardly build a new mill in Maine, in another general section notwithstanding the fact that one of the most successful coarse goods mills in the country is at Biddeford.

While the converse does not hold entirely true, there is but little tendency for a New England manufacturer to build in Philadelphia or in New York State. In other words the town location is generally in the same general section as are the other mills of the company or in which the management resides.

In choosing a particular town for a new mill the personality of the management comes in, since generally the founder of the mill wishes it near his home. This is especially true in sections of the country where the chief mill executive lives at or near the mill rather than in some central city, a system of mill management which to my mind has much to commend it.

The residence of the chief mill executive in the same community as his mills, tends to strengthen the bond between management and operative. The management can also throw its influence on the side of law and order and good citizenship, a feature much needed in mill communities. The prevalence of law and order in a community is one of the great factors in a mill's success, and should be carefully considered when any particular town is under discussion as a mill location. For this reason and to protect the mill from law suits and excessive taxation it is often a very good thing for a mill to be built at or near the home town of the chief executive. In the case of existing mills desiring to enlarge, a site is generally chosen near the existing plants, especially if labor conditions warrant. There are, however, conspicuous examples of a contrary policy, but in all such cases the occasion for the move is largely to tap new sources of labor and secure better operating conditions. Such mills brave the dangers of divided management in order to secure other advantages.

Those corporations which have divided their mills among different localities have avoided the dangers of over concentration of the operatives, so disastrous in Lawrence and Fall River. It does not seem necessary to take such radical measures as some New England mills did a decade or more ago, when they extended South. The wise course today seems to be not to create new sections for cotton manufacturing, but rather to decentralize and scatter plants within general sectional limits which are pretty clearly defined. This course has been pursued by Mr. Robert Knight.

PARTICULAR LOCATION ON A CERTAIN SITE

But it is in the matter of the particular location upon a spot that the least prejudice comes in and here questions are usually decided absolutely on their merits. Occasionally mills are located to suit the needs of a real estate dealer. I know of one mill in South Carolina which rejected a good site for a poorer one, so as to throw the trade of the mill village to the stores of one small town rather than another. This mill has always been handicapped by the unwisdom of that decision. Occasionally too great regard is paid to some one particular feature of mill location to the subordination of others. At one time most mills were driven from water wheels and it was necessary to locate them on low ground near the water, no matter how dark or inaccessible the site might be. So wedded are we to precedent and things that were, that even today mills are occasionally located on low ground because of nearness to water, when every other consideration make for a different site. In general, except for bleacheries or finishing plants, or a mill where unusual quantities of water are used, it is easier to bring water to a mill than it is to bring a mill to water and in these days of electric transmission, vastly easier to bring power to a factory than the factory to a dam site.

In making a specific location of the buildings on any mill site there are a few great principles to be observed. The first, at this time, is to be near an adequate supply of suitable labor. This transcends all other considerations whatsoever and all other questions are subordinated to it. Water can be brought long distances, goods, cotton and coal can be hauled as at many New Bedford mills, but labor absolutely must be had. Sometimes it is not well to locate a mill too near the homes of the operatives if the site be low or hot or unhealthful. It may pay to move a little to get better working conditions. But whatever decisions are made should be made with an eye single to that one thing, an adequate supply of suitable labor with operating conditions such that the work will run well.

Possibly next after the question of labor supply comes the question of adequate transportation. A mill should be easily accessible, not only for freight but for passengers. A mill easy to get to will generally be better managed than an inaccessible property. It should have adequate side track facilities, if possible connecting to more than one railroad. Coal should be unloaded by gravity and cotton and goods transported by cars as far as possible. The cheapest way for a mill to move freight is to have the railroad do it.

Next in importance comes light, air and drainage. A mill should, if possible, be on an elevation, like the new Coolidge Mill of the Amoskeag Manufacturing Company for example. Its broad sides should face north and south so as to give the freest entrance to light from the South, and also to catch in warm weather the prevailing breezes. The drainage should be away from the mill, for the easy care of sewage and surface water and to minimize danger of disease. A cotton mill should, among other things, look well. The employes like to work in a good looking enterprise. Sun, air and sightly location operate on the feelings of the operatives like clean windows and paint. It helps create "esprit de corps."

Last in importance, for an ordinary cotton mill, I should place—nearness to water. Water is indeed an absolute essential to a mill, but a beneficent Creator has distributed it so prodigally that it is practically omnipresent in cotton manufacturing localities. It is generally therefore near by and can be easily brought to the mill in quantities sufficient for our present economical power plants. As compared to the other qualifications for a successful mill site, immediate nearness to it is unimportant. Water should always be brought to the mill, if from a moderate distance, and reservoirs, if necessary for condensing and fire protection, constructed, rather than sacrifice a sightly location to go to a stream level. Very frequently a mill can be placed near water or springs and still be on high ground. That is an ideal which should always be sought for.

Even when these general considerations are clearly in the mind of the management, it is not always easy to secure the exact location to bring best results. An undeveloped site seen through underbrush or trees or covered with buildings presents to the average man but few theoretical aspects. It is quite customary therefore to call in at this point an engineer to map out the property and to put the theory of mill location into actual practice. A complete survey should be made showing outlines of the property, railroad, highways, water supply, sewers, lights, etc. If much water is to be used its handling must be worked out. If the mill is to be run by a steam plant, reservoirs must be located, coal trestles determined, side tracks decided upon. This may be done by securing accurate levels at frequent intervals all over the site and then carefully locating mill warehouses, power plant, water supply, sewerage, side tracks, village, streets, etc., all on a preliminary outline plan based on the information gained in the survey. It is only by some such method that the plant may be seen as a whole, its future development planned for, and false steps in so far as possible avoided. It is, I am sure, the experience of every mill engineer, as it has been my own, that more trouble in administration or costs of construction or difficulties in extension comes from poor planning at the beginning of the enterprise than from any other one source. I know of one mill which has its picker building where its power plant should be and so arranged as to make the extensions it now desires to make extremely difficult. Another has its warehouses where it now wishes to build a weave shed, a third is too near the edge of its property. The inadequacy of power plants is almost a truism in cotton mills. It seems to be peculiarly difficult to think of a power plant in terms sufficiently elastic to provide for the future of a mill property. While all these future developments cannot be foreseen, many can be provided for if sufficient study is given at the beginning.

With these general features of plant location in mind, it may be interesting to take up some specific hypothetical cases of plant location and see what ideal conditions ought to prevail. I realize that I am treading here on dangerous ground and that there are wide differences of opinion on these points, but since these questions are faced every day in mill engineering practice there is no reason why they may not be discussed here.

Let us suppose a New England corporation wishes to build a mill in New England on medium weight goods of plain weaves. What consideration of locality should influence it? First, as previously stated, the mill should be located near a good supply of cheap and reliable labor. Some manufacturers like to be in or near communities employing large numbers of men at low wages, so they can secure the services of the women and girls. But the time is rapidly approaching when cotton manufacturing must stand on its own feet in this regard and I believe a location for a mill, a little way from congested centers, yet easily accessible, is most desirable.

It is claimed that help want to be in a place of some size, to get the excitements of a city, go to moving picture shows, etc. This may be true to a certain extent, yet my observation is that a mill with good management, where the work runs well and an air of confidence prevails, can secure help of good quality, even though it is not in the so-called centers. It must not be too far away, however, and should be accessible to the larger places by trolley. Such locations may require the mill to furnish tenements, which many mill managers dislike and which involves additional expense. If

a village owned by the mill helps the labor question it justifies itself and the possession of mill villages may, in the hands of wise management, be a means not only of securing and holding help, but also of advancing them in the scale of living and making them better citizens, a consummation greatly to be desired. Certainly a comparison of the employes in some New England or Southern mill town, where the village is owned, controlled and operated in a quasi-paternal manner by the mill and the employes in a large center like Baltimore or Lawrence where tenement conditions prevail, redounds greatly to the advantage of the village community.

The more employment the mill can give to all the family the easier it is to secure help. The unit of labor in cotton manufacturing is the family. In no other industry can all its members, young or old, male and female, be so easily employed. This fact is frequently overlooked by legislators and by mill managers. It is of course largely the cause of child labor and other evils in the industry. Employment can be more easily given to all the family in a mill village, child labor controlled and less cause given for dissatisfaction than if the operatives are left a prey to real estate conditions. To operate a village successfully requires a higher and more generous minded order of management than it takes to merely run a mill. But with such management the ideal location for such a mill as we have mentioned is the small village, controlled and kept healthful by the corporation, located more or less near a large center.

Next to a good supply of labor comes the question of

TRANSPORTATION

Competition in railway service is desirable but often hard to secure, especially in New England. Arrangements should be made with the railroad in advance as to rates on coal, cotton and goods, the mill site should be chosen so as to make side tracks for coal and cotton available with a minimum of trucking and a point should be chosen with convenient passenger schedules to the nearest center. This latter point is more important than most people think. A mill hard to get to, no matter how ideal its particular location may be, is always at a disadvantage with some easily accessible mill. Any of you who have had to administer an inaccessible mill will recognize the truth of this statement.

Suppose that instead of medium weight plain weaves, it was proposed to find the best site in the country for a fine goods mill. The minds of most of you would probably turn to New Bedford or some favored portion of Rhode Island or Connecticut. Yet two of the foremost manufacturers of the South are just beginning to operate at Greenville, S. C., mills designed to make as fine goods as are manufactured in the United States. Suppose the case were a hosiery mill. Certain parts of New York State or the vicinity of Philadelphia would occur to most of us, but the hosiery mills with the lowest costs today are probably near Chattanooga, Tenn. One would probably say a mill to make standard drills should be located South, yet possibly the most consistently successful mill over a period of years on those goods is at Biddeford, Me.

Heavy ducks ought to be made where cotton is plentiful and cheap, yet no one would dare say that duck mills should cease to operate in Maryland or Massachusetts.

All of this goes to show that general conditions are equalizing themselves. Personally I think that New England is best adapted to make fine goods; especially fancies and most grades of colored or bleached fabrics; underwear manufacturers will do well to consider New York State. For certain grades of colored cotton and knit goods Philadelphia is still the manufacturing center. For plain weaves of medium weight goods and for medium yarns the South occupies a commanding position, while as good duck as is made in the world is produced at Baltimore. Many of you may not agree with me in these general conclusions and it is very difficult to demonstrate definitely the reasons for these deductions because so much of a mill's success depends upon the personality of the management. I can only offer these conclusions as the result of my observation and experience.

It is probably not so much the general location as the particular location which influences the fate of a mill, and the merits of the particular location are so welded with the activities of the management that it is next to impossible to separate them. But given able management the mill located with a far-seeing eye to the future, with proper consideration to healthfulness and ease of operation, will assuredly surpass a plant not so fortunately placed.

THE IMPORTATION OF SKILLED LABOR

By W. H. SMITH, 625 East Ave., Pawtucket, R. I.

In introducing an industry into a new field, or in extending one to the manufacture of goods of finer grade, it is vitally important that men trained in the processes of the particular manufacture should be available. Now the source of such a supply naturally lies where the finer goods are already being made, where the industry has taken root. If for any reason this existing supply is not available, the manufacturer must do as best he can with inexperienced help. This means that he is bound to have trouble. He may gain, finally, all the accumulated experience that is an important asset of any trade. But meanwhile, repeated delays and costly experiments hinder his progress. He finds defective goods to be the rule rather than the exception in his case. At the same time, the pioneer has to compete with successful rivals long established in the original home of the same industry. Evidently, his path is beset with many obstacles. These have been made manifest to the writer at first hand, in a particularly interesting way. During the last dozen years, he has had occasion to observe closely the development of a new industry. That this industry has not already suffered complete disaster is due only to the protection of a high tariff. The production of inferior goods has caused a useless waste of capital; late deliveries have caused an unfavorable impression on merchants kind enough to place orders. These meager results are due solely to the lack of skilled labor. That such labor should have been debarred from entry at our ports when

it was really indispensable to the success of struggling concerns has seemed in many instances nothing short of criminal.

It may be well to state briefly what we usually understand by the term "skilled labor." This term does not necessarily imply dexterous individuals, nor does it, on the other hand, necessarily exclude this idea; it means rather a number of laborers possessing the aggregate knowledge of methods practiced in the locality where they have worked. It is the accumulated experience that counts in the new locality. Nor should such an equipment be presented by one, or by a few men only. Obviously, one or a few men with a large class of apprentices whom they are delegated to train cannot make a contribution to the success of the enterprise equal to that of a smaller total of skilled laborers.

Two or three of the fields in need of foreign skilled labor may be mentioned at this point. Since this paper is addressed primarily to cotton manufacturers, we should note that the spinning of cotton yarns in fine counts is not yet carried on successfully in this country. There is considerable demand for these fine yarns; in the insulation of electric wires, for example; also in the lace trade, and in several other lines. Now this industry is not developed because there is not labor here skilled enough to spin such fine numbers. At the present time, therefore, manufacturers in these industries demanding fine counts are compelled to import in large quantities all the expensive cotton yarn. Similarly, the progress of the lace trade would be much more rapid if the supply of skilled labor were not curtailed. The manufacture of fine woolen goods is checked in much the same way as that of the cotton yarns just mentioned. Finally, fine glassware is also controlled almost exclusively abroad.

We now see how vitally interesting is the question of importing skilled labor for the development of domestic trade in all higher grade goods. Indeed, our legislators, foreseeing the necessity for that importation, have provided for a proper supply, in Section 2 of the Immigration Act of Feb. 20, 1907, which reads as follows:

"And provided further, that skilled labor may be imported if labor of like kind unemployed cannot be found in this country."

Nevertheless, this proper supply of skilled help is not available today. The reason for this is that the intention of the legislators is thwarted most effectively, not by the heads of the Department of Commerce and Labor, but by the commissioners and members of the Board of Immigration who appear to consider it their duty to exclude all the skilled help they possibly can, using any means to do so. The weapon which they are able to use for this purpose is the presumptive evidence clause. With that instrument they can do almost as they choose. Moreover, until some provision has been added to the present rules regulating this instrument, the existing outrageous conditions will remain with us, actually preventing the application of the particular feature of the law intended to meet the need which the legislators had in mind when they added the clause, "Provided further, that skilled labor may be imported if labor of like kind unemployed cannot be found in this country."

Several forces act in concert with these officials to keep skilled help from our shores. The important ones are the foreign manufacturers, and the labor union—both domestic and foreign. These influences combined present a very formidable front. The foreign unions and manufacturers are waging a war that we can all condone, for our gain is their loss. The American union holds blindly to the one idea of keeping out labor competition, and by this very action is stunting its own development; but that representatives of the government should form a part of such a combination, and thus prevent the development of new industries, is an anomaly that should need only to be exposed to cease. Unfortunately, such is not the case. To remedy the existing conditions there will be required very strenuous and combined action on the part of men who enjoy the confidence of the lawmakers of the country, who are interested in the development of home industries, and who will acquaint themselves with the facts.

The unscrupulous methods of foreign competitors are worthy of mention. One frequently sees advertisements in the daily papers of the lace centers in Europe, warning all persons who have received inducements to emigrate, or who are thinking of crossing on their own initiative, that they will hear something to their advantage by calling at the offices of the unions or of the manufacturers' associations. Any luckless wight who takes advantage of this offer has his ears promptly filled with awe-inspiring fiction which would be amusing if the effect were not so disastrous; for the tales of cruelty and enslavement, of imprisonment at Ellis Island with loss of time and money, and the many other horrible details which may be conjured up regarding a distant land, cause a revulsion of feeling in our hero which brings him to a speedy decision against any such risky venture.

As things are now administered at local immigration stations, it is absolutely unsafe for a skilled operative to leave his home on the other side with the idea of seeking work in this country. Some manufacturer, or envious fellow worker, or other interested person, may send a letter or cablegram, the means for transmitting this being invariably the local branch of the union. This message is received by some branch union of the same industry in the United States, where the insinuation that the worker is coming under a secret agreement is gladly seized upon. Consequently the word is passed along to the immigration station where the man intends to land. Of course, all the facts appear to confirm the message, for the man is on board, is going to the locality indicated, and will probably seek work at the firm that presumptively induced him to come out.

These facts will be better appreciated when a few specific examples have been given. The writer wishes first to tell of an interview that he had in connection with a case which interested him two or three weeks prior to the end of the last Roosevelt administration. In this case there were the usual elements of bitter opposition to the landing of skilled help by the immigration

officials. After a description of the joint efforts of three labor unions—American, French and English—aided by a commission of French manufacturers who were determined to prevent the development of the lace industry in the United States, the senator to whom an appeal for help had been made was so astonished at what was transpiring that he suggested submitting the facts to the president. For that purpose he secured an interview with Mr. Roosevelt. The latter, after acquainting himself with the facts, expressed himself in substance as follows:

"We must get legislation that will prevent this iniquity, and so permit the entry of skilled help rather than that of so many undesirables. All this is wrong; it is just the opposite of what should be."

Let us now consider the specific cases. The first is that of a man who came to New York about eighteen months ago intending to seek work at Pawtucket, where he had a friend. He wrote to this friend from Liverpool to tell him of this intention, and of his sailing. At the local plant the letter was mentioned to a foreman, who spoke to the superintendent. The latter sent back word to the immigrant that no situation could be promised until he applied. When the immigrant arrived at New York he received this message. He admitted to the board, on examination, that he was going to seek employment at the firm in question. This confirmed a message which the immigration officials had received from the Union. In this particular case, upon being notified that a hearing of a board of inquiry would take place the following morning, the writer attended the court at Ellis Island, and had the assurance given him by the president of the board, after adjournment, that the man would not be deported without further inquiry. At the time, the company supporting his defense had a number of machines, costing about $7,000 each, standing idle for lack of just that kind of help, and orders months old on the books. These facts had all been presented to the board of inquiry. Moreover, there was not a shadow of evidence indicating that any communication, direct or indirect, had taken place between this man and the company. Hence, his case seemed to be quite clear, his right to land indisputable. Yet, on the next morning, to the company's utter astonishment, in spite of the promise of further inquiry made by the president of the board, the man was put aboard the St. Paul, and deported as contract labor.

A little later, three men and their families were taken to Ellis Island on their arrival. One of these had worked in the United States for seven or eight years, and had several children born in this country. These three men, having come entirely at their own risk and expense, felt outraged at the order for deportation and at their long detention consequent on the appeal to Washington. Not until one of the senators had used his influence to bring the facts of the case to the personal attention of Secretary Nagel, were they finally landed. This senator rightfully claimed, in one of his interviews with the secretary, that the man with several children born in this country, who had gone away for a short time only on account of his wife's health, had the obvious right to return. Further, there was found against him no evidence whatsoever of inducement or contract. Now the interviews in Washington, secured through the courtesy of representatives from the state, were obtained at the cost of much time and trouble for all concerned. As a matter of fact there is no statute which prevented these immigrants from landing, since this kind of labor was not obtainable at any price in this country, in which case the law provides that it can be legally imported. Finally, in the instance just given, the efforts made by certain officials to debar these men were so disgraceful that when reported to the department at Washington this attitude actually helped the men's case far more than any merely negative proof which the company could offer in their behalf.

Another case well illustrates this point. This man was about thirty years old, competent, and the owner of several hundred pounds sterling. With the view of improving his prospects, he gave up his trade to try farming in Canada. But circumstances did not favor him, so that when a good opportunity of selling out presented itself he seized it, and decided at the same time to try his chances in the United States. Incidentally he had relatives in New York state. He was successful in obtaining employment as a lace weaver, his former trade. However, he had not been many days at work before some union man denounced him to the immigration officials as having been imported under contract. He was therefore arrested, taken from Pawtucket, R. I., to Ellis Island, and detained there for eleven weeks. It was the Hon. C. E. Hughes who represented the company in this case. So clear and so final was the evidence proving that this man had had no correspondence whatsoever with the company employing him that the then Secretary Cortelyou found it necessary to overrule the Commissioner and to allow the man to land. The total expense entailed, exclusive of the loss of time, was about one thousand dollars. Moreover, there was, of course, no compensation to the man for his arrest, for the loss of eleven weeks' work, nor for his degrading detention in company with repulsive immigrants of the most destitute class.

Notwithstanding the obstacles which stand in the way of manufacturers who desire foreign skilled help, some measure of success has been realized in bringing in, during the present year, a considerable number of lace makers.

Some of our own members may be interested to hear what information the writer has gathered regarding the means of complying with the law. In the first place remember that the only condition on which contract labor may be imported is that "labor of like kind unemployed cannot be found in this country." To satisfy this condition it is necessary to advertise in the local centers where such help is likely to be found. Copies of the advertisements and receipts for their insertion should be kept. Notice must be sent to the Commissioner of Immigration that certain individuals are expected to land at this port. The following items must accompany this declaration:

The names and profession of the workers;

The name of the ship on which they are coming, with its port of clearing;

The advertisements and receipts for same;

A statement of the steps taken to secure such help in this country;

Affidavits with particulars regarding the lack of help in this country; these are the steps which the department advises.

Some intelligent person must be sent to meet the boat. In case the immigrants are detained this person should request the Commissioner of Immigration for permission to attend the session of the board of inquiry at which the immigrants are to appear. This will furnish an opportunity for testifying in behalf of the men who are detained.

If the board decides for deportation it will be necessary for those involved to file appeal blanks. It is the duty of the officials to bring these blanks to the attention of each of the individuals who are ordered deported. The Commissioner of Immigration forwards these appeals to the Secretary at Washington. It is advisable for the manufacturer to send a letter at the same time, stating his side of the case. In most instances it is not essential to employ legal talent, for when the spirit of the law has been carefully observed, together with the other precautions just mentioned, the appeals will generally be sustained on their own merits.

It may not be a waste of time when planning to meet a boat to get in touch with the landing agent of the steamship company. This officer, acquainted as he is with the personnel of the immigration station, can sometimes give time-saving and really valuable directions.

An exhaustive treatment of so vital a subject is hardly possible in a paper of this scope. Our main object has been to state the problem and to emphasize its importance. If we have accomplished this aim, we trust that the attempt will have been worth while.

WORKMEN'S COMPENSATION LAWS IN THE UNITED STATES

By CHARLES E. HODGES, Treasurer, American Mutual Liability Insurance Co., 50 State St., Boston, Mass.

For many years attempts have been made to pass workmen's compensation laws in the State of Massachusetts, where I believe the earliest attempts were made, but not until 1911 was any such law passed in this country. In that year the following states adopted compensation laws: California, Illinois, Kansas, Massachusetts, Nevada, New Hampshire, New Jersey, Ohio, Washington and Wisconsin. These did not all go into effect in that year. In 1912, Michigan and Rhode Island passed similar laws. A compensation law was passed in New York and became effective on Sept. 1, 1910, which has since been declared unconstitutional. Compensation laws first became operative in the eastern states in New Jersey. This was on July 4, 1911, so that we have had in that state one full year's experience in the working of the law.

In all of these states, excepting Washington, and Nevada, the compensation plan is optional with the employer. There is a penalty for not adopting the plan, differing in the various states, but generally it deprives the employer of his principal common law defences. In the State of Washington the compensation law is compulsory, and comprehends state insurance as well. Ohio and Michigan also have provisions for a form of state insurance; in the former the compensation can be paid only through the State Insurance Company.

In Massachusetts there is an insurance feature included in the law which practically provides that no employer may pay the compensation to which his injured employe is entitled except through some insurance company, either the mutual company created by the act itself or any other liability insurance company legally admitted to do business in the state. The principal reason for this is that some employers might not meet their obligations to pay compensation to injured operatives by reason of financial inability to do so, but all insurance companies authorized to do business in the state are under the supervision of the Insurance Commissioner, and if their affairs are in such condition as to endanger the insured, the Commissioner will immediately forbid their making any further contracts of insurance; therefore, the insurance feature is a reasonable and desirable one. But this difficulty is met by the New Hampshire law in a different way, and probably as effectually. In that state the Commissioner of Labor may require of any employer a bond, insuring the fulfillment of his obligation to pay the compensation and such a bond may be obtained from bonding insurance companies. This plan leaves the employer who is in a strong financial condition free to pay the compensation direct to his employes, which in many instances, as in the case of large organizations like railroads, is a distinct advantage to the employer. The railroad corporation is usually so organized that it may easily maintain an insurance department of its own.

Nearly all of the compensation laws provide that the injured employe is not entitled to receive compensation during the first few days following the accident. The period varies from one to two weeks in different states, the object being to discourage what is termed "malingering." There have been various amusing incidents resulting from this provision. Not long ago a man was slightly injured in one of the cotton mills of Massachusetts. He stayed out for fourteen days and on his return explained to the overseer that he could have returned earlier but he understood that he would not be entitled to compensation unless he stayed out two weeks,—he received no compensation.

I will not undertake to make a detailed comparison of all the laws, but will mention only a few of them, leaving the others to a tabulation which will be made a part of this paper.

In New Jersey an employe may receive compensation for temporary disability where there is no specific injury at the rate of half his average weekly wages during the period of disablement, subject to a maximum of $10.00 and a minimum of $5.00 per week (unless he earns less than $5.00, when he receives full wages). Or he may receive

compensation for a definite period—subject to the same weekly limits—for certain specified injuries, such as the amputation of a hand or foot; but he is not entitled to compensation under both of these provisions.

In all the laws provision is made for surviving dependents in fatal cases.

The payments under the New Jersey law are somewhat less than under the laws of Massachusetts. Under the Massachusetts law an employe is entitled to compensation under three sections: half wages during the period of total disability; in addition to this, half wages for a fixed period, varying in amount according to injuries specified in the act; also he is entitled to receive after he returns to work one-half the difference between what he was able to earn before the accident happened and his weekly earnings afterwards.

The provision for medical attendance varies from two weeks in Massachusetts to eight weeks in Illinois, and ninety days in California.

In New Jersey the method of procedure is very simple. In case of a dispute between the employe and the employer in regard to a claim for compensation the question may be submitted to a Judge of the Court of Common Pleas of the county that would have jurisdiction in a civil case. He may determine such disputes in a summary manner and his decision on all questions of fact are conclusive and binding.

In Massachusetts the law creates an Industrial Accident Board consisting of five members who are appointed by the Governor, who have power to form committees on arbitration to hear and decide similar disputes. No compensation agreement with the employe is binding unless approved by the Industrial Accident Board, whereas in New Jersey, an employe and employer may ultimately agree upon the amount of compensation and when the employe accepts the compensation thus agreed upon the agreement is practically binding.

In Massachusetts it is impossible in any case to commute to one lump-sum payment the compensation unless the weekly payments have been made for a period of six months, at which time the Industrial Accident Board may in unusual cases allow a lump-sum settlement. In New Jersey such a settlement may be made at almost any time by the Judge of the Court of Common Pleas upon the application of either party, provided he finds the plan of compensation to be in the interests of justice. This provision of the Massachusetts law occasions great hardship in many instances. The insurance company with which I am connected recently agreed upon a compensation settlement with the widow of a man who was killed in an industrial accident. She was a foreigner, having no relatives and almost no friends in this country, practically alone here, with one small child. She was anxious to return to her native country. The matter was laid before the Industrial Accident Board and the woman's case was strongly urged by her employer, through the insurance company, all parties concerned being anxious to pay the widow a lump sum in order that she might return to her family and friends, but the Board was obliged to rule that such a settlement could not be made and the insurance company must continue the weekly payments for six months before a commutation might be made. But there is another side to it. An ignorant employe who suddenly receives a considerable sum of money at one time is liable to be the victim of interpreters and unprincipled friends, who find easy means of separating the injured employe from his recently acquired wealth. Where the payments are made at intervals in small amounts there is less danger to the employe from this source.

For those of our members who are residents of Massachusetts I desire to say that our Industrial Accident Board has shown a disposition to fairness and justice which reflects the highest credit upon its members. It is with feelings of the greatest relief, when a dispute arises between the insurance company and employe, that we reflect that the matter may be laid before an impartial board whose decision we feel confident will be just and right, even though it may not in every case coincide exactly with the insurance company's view of justice. The success or failure of the law depends upon the action of this Board—if its decisions are weakened by excess of social sympathy, we shall soon be in the dilemma in which Germany finds herself.

Many interesting questions will arise out of the compensation laws and it will take a long time to decide all of them. The laws generally provide that compensation is due to employes suffering injury by death or accident "arising out of and in the course of his employment," without any reference of course to the question of the employe's negligence except such as amounts to wilful or serious misconduct. For instance, it has been held that a commercial traveler may be regarded as acting in the course of his employment so long as he is traveling on his employer's business including the whole period of time between his starting from and returning to his place of business or home.

An accident occurring while making an attempt to save the life of a fellow-workman was held to arise out of and in the course of the employment.

An injury to an engine driver who was hit by a stone thrown by a boy from an overhead bridge was held to be an accident arising out of his employment.

A workman engaged as a laborer on the public roads was required to go for his pay to the tramway depot situated in a public road some distance away. The workman was paid for the time occupied in going to and from the pay place. When returning to his work, after receiving his wages, he mounted a tram car but, finding that it did not travel to the place where his work was, started to get off and was struck by a passing car and injured. It was held to be an injury arising out of and in the course of the man's employment.

A workman will be held to be acting in the course of his employment when, having ceased actual work, he returns to the premises to obtain his pay, even though on such ceasing of such actual work, the relation of master and servant is terminated. A mill-hand whose employment had ended attended at the employer's mill to receive her wages a few days later in accordance with the arrangements of trade. She met with an accident while leaving. It was held that the accident arose

out of and in the course of employment. These are all English decisions. It is too early yet to cite the decisions of our own courts.

In most of our laws an employe guilty of serious and wilful misconduct, or where the injury is intentional, or self-inflicted (the language varies), the employe is not entitled to compensation. The term "serious and wilful" has been the subject of much dispute in England. Where a workman knowingly breaks a rule made by the employer in the interests of the safety of the workmen and for their own protection and that of the public, such an act on his part is evidence of serious and wilful misconduct, within the meaning of the act. This was practically the decision of the House of Lords. The facts were briefly as follows: An engine driver climbed back on the tender of his engine for the purpose of getting a certain quality of coal which he knew to be there, thus acting in direct violation of the company's rules forbidding the driver or fireman to leave the running board while the engine was in motion. The engine driver was killed. The result of the decision was not that engine drivers paid better attention to the rules of their employers, but the law was so amended as to make an exception in case injury results in death or serious permanent disablement, so that if an employe in England is killed in the course of his employment compensation must be paid, although his death was the result of his serious and wilful misconduct.

In Massachusetts the manufacturing employer who does not insure the compensation of his employes is a rare exception. There are cases where an employer, perhaps resenting the obligation to pay the compensation through an insurance company, has decided to insure himself against claims based upon the negligence section of the law.

In regard to the cost of accidents to employes under the new laws, I believe the employer may reasonably hope that ultimately it will not be as great as the current rates of insurance against the compensation make it appear. I think the insurance companies have acted wisely, in fact could hardly have adopted any other course, in making the rates as high as they have done. The system is an untried one in this country and no one can foresee with certainty what the ratio will be between the cost of accidents and the wages paid to employes, which is the basis used in determining the premium for insurance.

The insurance companies have tried to differentiate in making rates in the several states according to the degree of liability to loss due to the variation in the laws. No rate combination among insurance companies is likely to be strong enough to withstand the competition of companies which are always to be found outside of such combinations, and therefore, if the rates for a while are higher than they should be they must be reduced, and I believe there is no disposition on the part of most companies to maintain extortionate rates, although of course the stock liability companies are not in this business for their health.

The tremendous agitation of this whole subject will in itself tend to diminish the cost of industrial accidents because the number of such accidents must inevitably decrease. The manufacturer is more alive than ever before to the necessity of providing every reasonable means of safeguarding his works, ways, and machinery. The inspections made by insurance companies will be more rigid than ever before, laws will be passed compelling safeguards, and I have even heard some employers, inspired by this movement, assert that they will henceforth insist upon a more careful selection of employes engaged to work upon dangerous machinery. Offsetting this to some extent, the compensation laws will be modified from time to time, probably tending towards higher compensation and greater benefits to the employes. Ultimately, perhaps, there will be such uniformity in the workmen's compensation laws of the various states that the added tax upon the employer will not cause embarrassment, especially in so far as competition among domestic manufacturers is concerned.

The success of this whole scheme depends largely upon the fairness and magnanimity of employers and insurance companies on the one hand, and employes on the other, combined with unbiased decisions by the boards of arbitration.

I feel very sure that the disposition of employers and insurance companies alike is to deal fairly and liberally in the adjustment of compensation claims. In justice to liability insurance companies it should be said that the contracts which they issued in the past were specifically limited to indemnifying the employer for loss which was the result of claims founded upon the employer's negligence, and they did not pretend to provide compensation for injured workmen. Many employers, as well as employes, never wholly understood this and believed that the premiums were paid for a sort of accident insurance for the benefit of the employe; to this misunderstanding is due to a great extent the popular impression that insurance companies have dealt unfairly with employers and their employes in the adjustment of claims. Now, this is all changed. The insurance companies have charged what is believed to be an adequate premium for insurance which is more or less clearly defined by the laws which govern the contract, and I believe it will be found that the insurance company is quite as anxious to pay the compensation which the law prescribes as the employer would be if he carried his own insurance.

For many years we have been confronted by these two propositions: No one should be obliged to pay for the injury to another unless it was caused by his fault. This is reason; but, on the other hand, a workman earning small wages, disabled by accidental injury arising out of his employment, should have pecuniary aid, even though his employer was not at fault, and his own carelessness may have, to some extent, contributed to his injury. This also is reason. These propositions are diametrically opposed to each other, and to reconcile them the workman's compensation acts are the earnest attempts of legislatures. How well they have succeeded we cannot now judge, but we all feel that the effort is in the right direction. I think the time has come when we must consider the human being even more than we have in the past, and less than we have in the past the dollar which he earns for us.

Correspondence and Notes

UPON TEXTILE TOPICS AT HOME AND ABROAD

FANCY COTTON VELVETS

BY ROBERT DANTZER

[Translated from the French by the Editor of the Textile World Record.]

(Continued from August.)

The third stroke cuts the floats in the section, f, for 1/4 of their length. Finally the floats

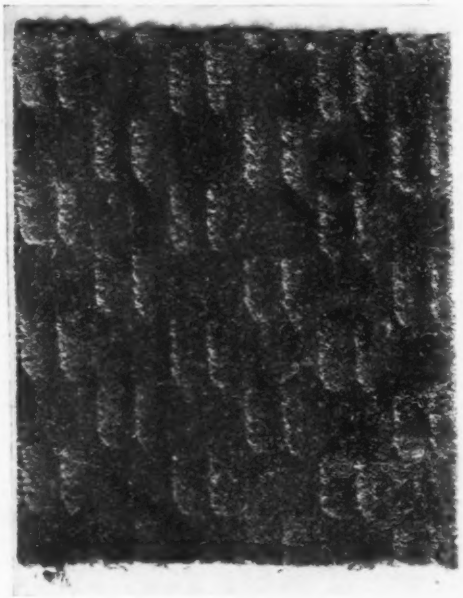

FIG. 15.

in the section, g, are cut in the center by the fourth passage of the knife. The long tufts

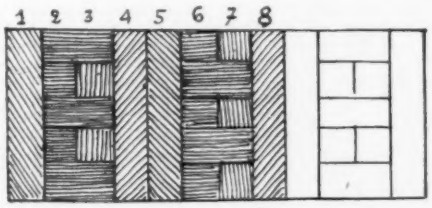

FIG. 19.

rising from the sections, a and d, are always on the same side of the knife, at the right in the present illustration. This point is important for it enables all the tufts to be placed on the same cord by the finishing

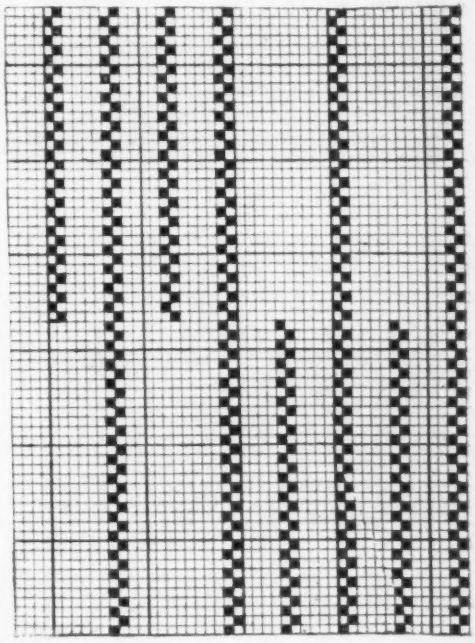

FIG. 16.

process. While in an uncut velvet the stitching threads are visible, these threads are completely covered when the velvet is cut, and thus the longitudinal furrows are formed. This point is illustrated by Fig. 15,

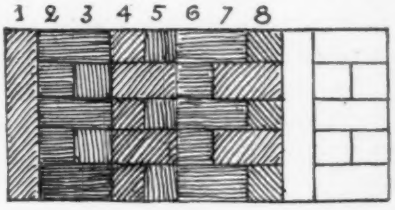

FIG. 20.

which shows a finished velvet. The weave is shown at Fig. 16 and conforms in every re-

spect to the uncut velvet, Fig. 9. The design shown at Fig. 17 is but a variation of Fig. 9, the planchettes being separated by two cords.

of the cutter. Fig. 19 represents the velvet shown at Fig. 17, eight passages of the knife being required for the patterns. The pile cut

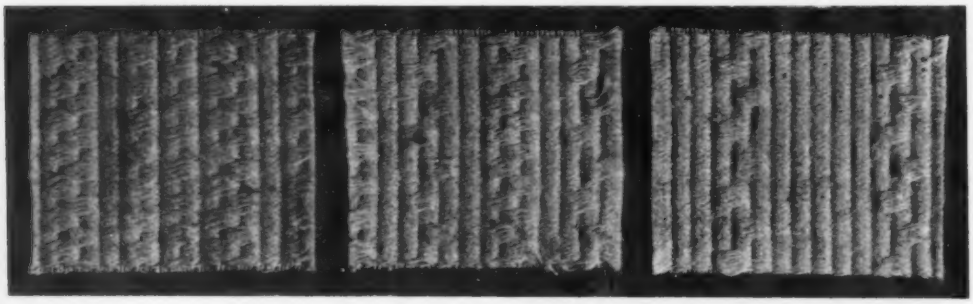

FIG. 21. FIG. 23. FIG. 25.

All of these velvets are cut with a knife similar to that shown at Fig. 18. As there are two lengths of floats the knife should

at each stroke is indicated by a special shading, for example, the horizontal lines represent the parts cut at one stroke. Fig. 20

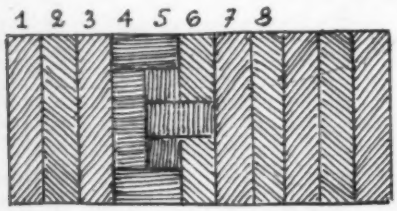

FIG. 24.

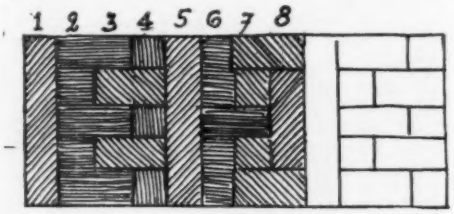

FIG. 22.

have a cutting edge, as shown at b, for cutting the shorter floats, while the long floats are cut by the edge, c. This construction of

represents the fabric shown at Fig. 21. This pattern also requires 8 strokes of the knife. The first passage of the knife cuts all of the

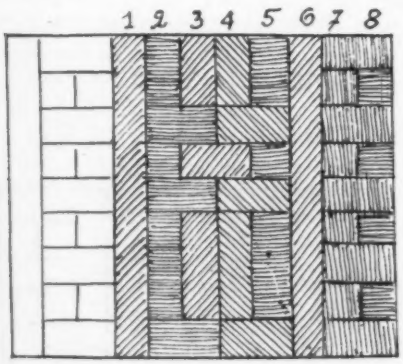

FIG. 26.

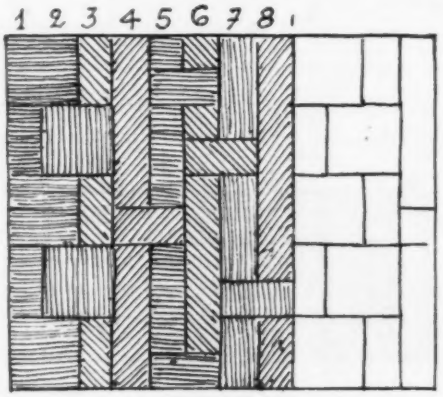

FIG. 29.

the knife is of great importance. The guide, a, is of the usual form with a point, d, projecting to prevent any deviation in the course

pile picks at the center. By the second passage the cut is irregular because the knife comes in contact with the planchette. The

third cut is regular, but affects only a part of the pile picks, the other part having been cut at the preceding stroke. Fig. 22 represents the cloth shown at Fig. 23. The planchettes are arranged on three consecutive ribs. Eight strokes of the knife are required for each pattern which covers 8 ribs. At the

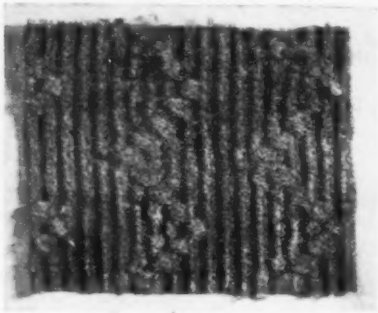

FIG. 32.

third passage of the knife the planchettes only are cut. At this passage there is a tendency for the knife to deviate from its course and cut floats reserved for the fourth passage. This is also true of the seventh passage, Fig. 20. The long tufts produced by

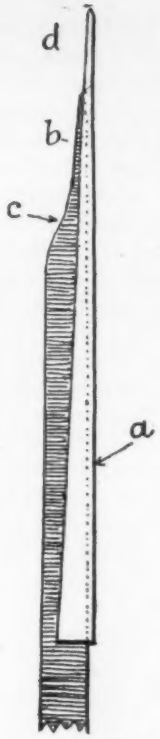

FIG. 18.

FIG. 27.

FIG. 28.

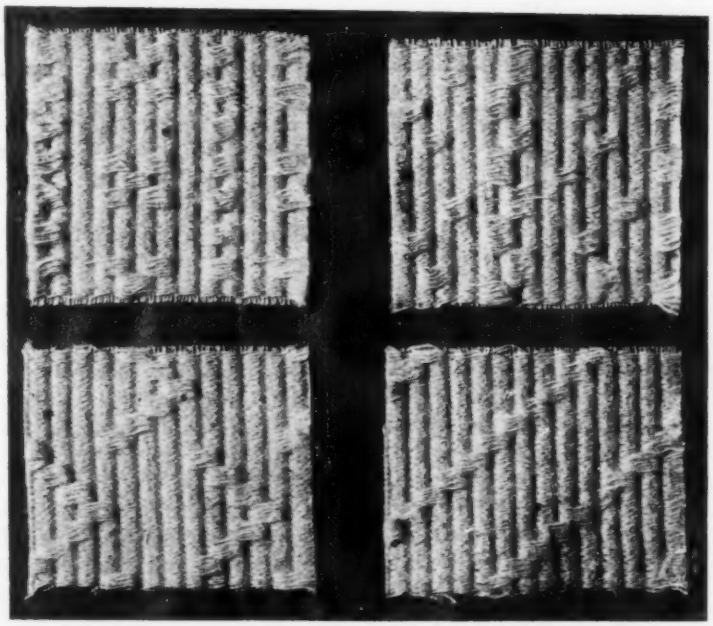

FIG. 30.

FIG. 31.

the preceding cut tends to prevent this deviation. Fig. 24 is a sketch of the fabric shown at Fig. 25. The planchettes are arranged on three consecutive ribs and are separated by several picks. Fig. 26 is a sketch of the cloth shown at Fig. 27 and the pattern requires eight passages of the knife. In all the samples which have been given the planchettes are of the same size in each pattern. Two sizes of planchettes are found in the cloth shown at Fig. 28, the pattern of which is shown at Fig. 29.

It is evident that an indefinite number of patterns can be obtained by varying arrangements of the planchettes. Several designs are shown in the uncut fabrics, Figs. 30 and 31, and also in the finished velvet, Fig. 32. The fabric shown at Fig. 32 has a plain weave for the ground instead of a 4-leaf twill. The cloth is, therefore, much lighter in weight, and consequently can be produced at a lower cost.

RAMIE

BY ERNEST SUMNER

Rhea, china grass and ramie are all synonymous terms for a bast fiber which grows in China, India and other eastern countries, and which has been used by man from time immemorial. It was an article of commerce at least three thousand years ago, and the oldest known pieces of cloth, found in ancient tombs and cake dwellings of the stone age, and now preserved in museums, are considered to have been made from this fiber.

Ramie is a nettle, its botanical name being "Urtica Boehmeria." In China it has been grown and utilized for centuries, being held in high favor because of its beautiful luster, great strength and ability to stand washing. Many Asiatic peoples use it for clothing, sails, nets, etc. The development of the ramie industry on a large scale in this and other countries has been greatly retarded because of the difficulty of degumming the fiber. For many years those engaged in this industry in Europe and America seemed to look upon ramie as a mere substitute for other textiles, instead of devoting their energies to developing the rare and undoubted qualities wherein it excels. Recently, however, ramie has been sold for what it really is, and its merits have been so quickly realized and appreciated by the consumer that now, to increase sales, many other fabrics are being advertised as ramie. "Ramie linen, made of pure flax," is often seen in the newspapers, but if it is pure flax it cannot be ramie. The advertisers are guilty either of ignorance or deception, and possibly both. To attain the success that this remarkable fiber deserves it must be used in those articles of everyday use which would be put before the public as ramie, so that the distinctive merit it possesses may be recognized and become known to all. In no other way can an assured position be obtained.

Ramie makes a most perfect fabric for the gas mantle trade, its strength and absorbent qualities affording exceptional advantages in this direction, and its superior worth is generally acknowledged. For underwear it is ideal. Being a nonconductor of heat, it is warm in winter and cool in summer, and its absorbent qualities make it of hygienic value. During the past summer it has been impossible to secure sufficient supplies of genuine ramie dress suitings to fill the demand, and in consequence, linen suitings, more or less pure, have been substituted and sold as "ramie linen," with the accent on the ramie. Ramie cloths for men's summer suitings have met with good success, and indications point to a large trade in this line for next season.

Ramie has suffered from the exaggerated claims of its enthusiastic friends. It has its limitations, while, at the same time, possessing a great many points of excellence in which it far surpasses its nearest rival. It can be spun into yarn as smooth and almost as fine as cotton, has a high luster, is the strongest of all vegetable fibers, takes dyes readily, does not shrink, and is practically non-rotting. Progressive manufacturers are realizing the opportunity which this new, yet very old, fiber offers for the production of high grade fabrics having a character all their own, fabrics that will make an im

mediate appeal to people of taste and refinement, who are quick to appreciate genuine merit and are willing to pay a fair price for it.

COP SPOOLING

BY GLENDORA

Cop spooling, although often regarded as a simple process, requires constant attention if good work is desired. Where different numbers of yarn are spooled, it is a good plan to let each attendant remain on one number for a certain length of time, especially if the spooling is done by piecework, with a different price for each count.

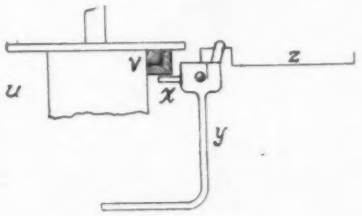

FIG. 1.

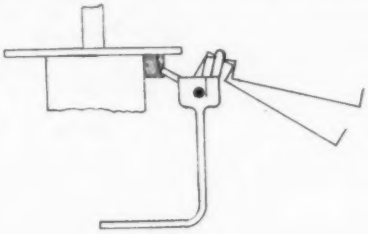

FIG. 2.

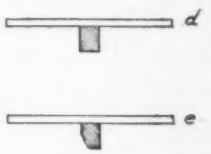

FIG. 3.

In this way no partiality is shown, each attendant works in turn on a different number and all are generally satisfied. All imperfect cops or bobbins, such as cops with clearer waste, ooze, bad piecings, rust or oil, and bobbins with picked ends, cockled yarn,

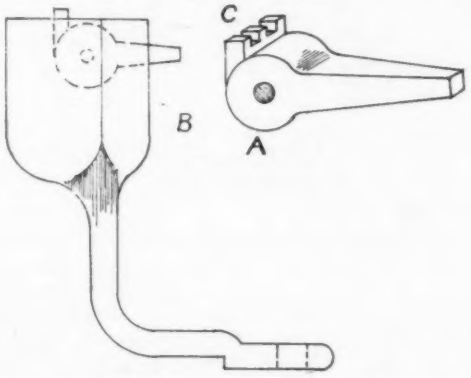

FIG 4.

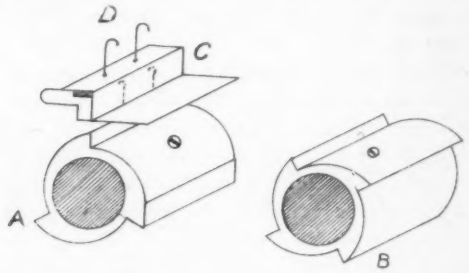

FIG. 6.

FIG. 7.

tops pulled off, bottoms run over, lashed by band, and soiled, should be laid one side with the ticket showing from which machine they came. Every night this imperfect work should be picked up and returned to the spinning department with a written complaint.

The yarn spooled by each attendant should be looked over systematically, and such faults as spools being too full or not full enough should be shown to her. Spools when too full are apt to have the yarn pulled over the heads, in handling, thus making waste. If the spools are not full enough, production is lost at the spooler and also at the next process. A special gauge, the size to which it is desired to have the spools filled, applied to the spools occasionally, is a convenient method of demonstrating these imperfections in spooling.

It is advisable, where one spooler-tender can supply enough work for one or more of the machines in the next process, to have at least one machine filled entirely with one girl's work. If the machines are looked over, say, once a week, for different spooling faults such as long knots, split ends (when two or more ends are wound together on one spool), dirty yarn, kinks, doubles, singles and imperfectly filled spools, the spooler-tenders can be called to the machines or the spools brought to them.

The amount of waste that the attendants can pull from bottoms of cops and bobbins

should be decided upon and the waste then followed up regularly. Some hands seem instinctively to have a knack for running the cops and bottoms down very economically. Others make an unnecessary amount of waste. If knotters, automatic or otherwise, are supplied, they should be examined regularly and kept in good order and, most important of all, used.

Cleaning should be done at stated times. Spoolers may or may not be stopped when fanning off the loose fly. If there is a large quantity of fly, the chances are that some of it will become incorporated in the ends, making uneven yarn at the next process. Clearers, bunch-catchers, or slub-catchers, used for the purpose of cleaning the yarn, should be examined frequently to ascertain whether they are set to the proper gauge. Often, when a clearer has been set a trifle too close, breaking the end occasionally, the attendant may pry it open, making a bad matter worse.

When two or more ends are wound together on a spool, detector wires are necessary, to prevent singles should one end break or run out. These wires must operate promptly. On spindle spoolers a small lug is generally inserted in the bottom side of the spool-seat on the spindle. The drop-wire tumbler engages with this lug when an end breaks, or runs out, and stops the spindle. Worn lugs permit the spindles to turn several times after the wires have dropped and should therefore be turned to present a good side, or renewed.

Fig. 1 shows position of detector-wires and tumbler when the yarn holds wires up. U, shows spindle jacket; V, lug or stop, inserted in bottom side of spool seat; X, tumbler; Y, drop-wire stand; Z, drop-wires.

Fig. 2 shows position of tumbler when one or more of the drop-wires fall.

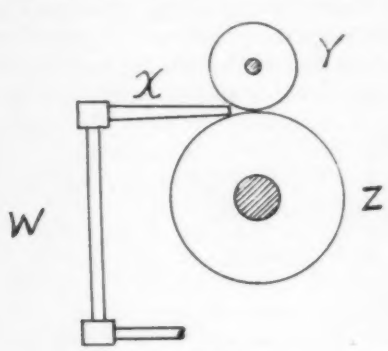

FIG. 8.

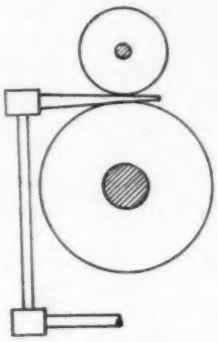

FIG. 9.

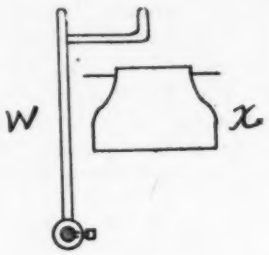

FIG. 10.

Fig. 3 shows lugs in good and bad condition; d, showing good lug, and, e, worn lug.

Drum-spoolers usually have a revolving shaft, on each side of spooler, fitted with three-lobed castings, one casting for each detector-box. The falling drop-wires come in contact with the revolving casting and are pushed against detector-box, lifting it, and stopping the spool.

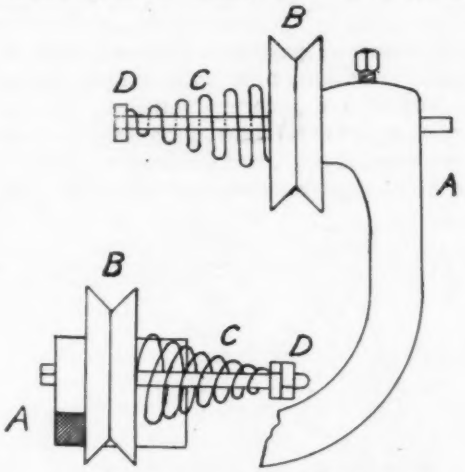

FIG. 11. FIG. 12.

Fig. 4 shows drop-wire stand, also showing position of tumbler. Fig. 5 is the

tumbler for drop-wire stand. C, Fig. 5, are spaces for drop-wires to prevent them from crossing and to keep them from going over the sides of the tumbler.

Sometimes drop-wires become bent and do not work properly, causing singles. The attendant loses considerable time pulling off the single and makes more waste. There is always a possibility of not getting the ends together, making what are known as "split"

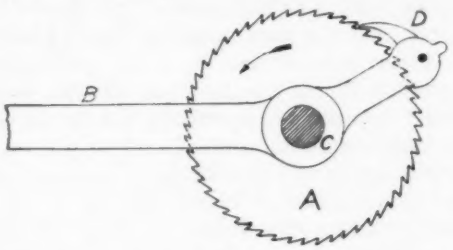

FIG. 13.

ends, which generally break, and sometimes tangle, in the next process.

The yarn in running through the detector-wires must be held taut enough to prevent them from dropping, yet not so taut as to cause breakage. To accomplish this, a tension, friction, or drag, is used, such as a

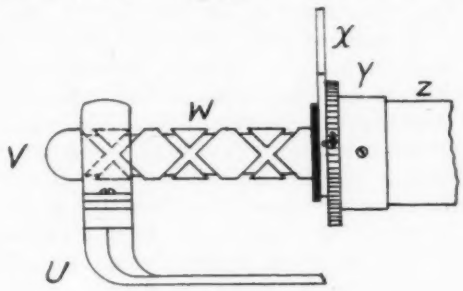

FIG. 14.

brush, flannel-covered roll, or board, and in some cases, metallic devices. A tension should maintain an equal amount of friction on each side of the ends wound together, and should straighten, or take out all spinners' kinks. Proper conditioning of the yarn, especially mule yarn, helps to keep the yarn smooth, and in general materially aids the spooling.

On a drum-spooler, about the same number of yards per minute are wound on the spools, whether empty or full. In this case, the friction developed by the yarn in running over the tension device, is uniform. On a spindle spooler, however, the conditions are different. The spindles revolve at a uniform rate, but, as the diameter of the full spool is much larger than that of the empty spool, the number of yards wound per minute increases as the spool gets larger, and the tension also increases. To obviate the excessive friction developed by large spools, some spoolers are equipped with two rows of spindles of different sized whorls on each side. When the spools in the first row are about one-half to two-thirds full they are transferred to the slower running back spindles.

If the tension device is a flannel-covered-roll extending the length of the spooler and having an automatic traverse motion, which turns the roll and also gives it a side movement, the motion should be carefully watched. Its failure to move will result in the yarn cutting the flannel, and soft places in the yarn will then get through, and the spools will be wound soft. Moreover, the life of the tension device is shortened, as the cut flannel will have to be replaced. Some tensions that are in the form of flannel-cov-

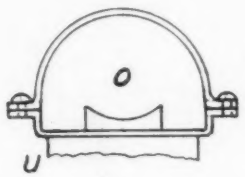

FIG. 15.

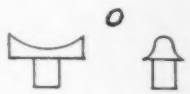

FIG. 16.

ered-rolls have the flannel on only one-half the circumference of the roll; the other half is coated heavily with shellac, or covered with tin or other sheet metal. The object is to enable the tension or friction to be varied. When the spools are getting full on spindle spoolers, or when a poor quality of stock is going through. The manipulation of this tension is generally left to the discretion of the spooler tender. On this account the device should receive close attention, because occasionally the help will keep the friction

arrangement in one place, causing its early ruin.

Metallic or other tensions should be regulated to a proper degree of tension. It is important that enough friction be developed to prevent any kinks from going through, as a kink in one strand will decrease the breaking strength of any ply-yarn very appreciably. The friction of the cops and bobbins increases as they are wound off, becoming greatest at the lowest point. More breakages occur when the cops or bobbins are nearly run out than when they are first started. Automatic tensions which lessen the friction as the cops and bobbins get small, will, no doubt, help overcome this difficulty. The guide eyes should be directly over the skewer which holds the cop or bobbin. Cops require more attention in this respect than bobbins, for the larger diameter of the latter enables them to run off, even if slightly out of center with the guide eyes. A good method of centering skewers is to hank a plumb-bob from the guide eye. If the plumb-bob is "out" equally at both top and bottom of the skewer, the guide eye can be moved. Should only the top or bottom of the skewer alone be out of center, then the skewer-holder can be packed to bring the skewer in line. Individual skewer holders, one to each skewer, fastened to an iron rod by means of a set screw, are easily centered.

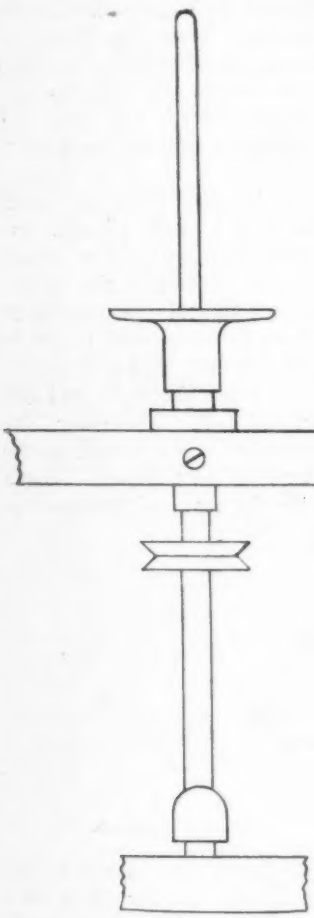

FIG. 17.

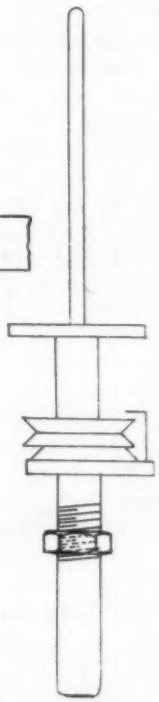

FIG. 18.

Spindles should run freely. The old style spindle with the point running in a brass bearing, and with a brass sleeve at the center of the blade, requires oiling about once a day, to give good results. The modern self-centering spindle, with bolster and blade in a bath of oil contained within the base, will run from two to six months without replenishing the oil. Bands on spindle spoolers should be tied to secure a uniform tension. By this means the spools will fill evenly and the production be uniform.

An important fact, which may be overlooked until trouble occurs is that drop wires, guide wires, in fact any wire with which the yarn in process of winding comes in contact, will eventually become cut. A regular system for examining these wires should prevail and the wires either smoothened up or renewed. Particularly should these points be looked after when changing from a finer to a coarser count. If the wires have been cut by the finer yarn, the coarser yarn will be chafed, or at least, become very fuzzy in running through the grooves. Fine yarns cut into any substance in less time than coarse yarns.

Figs. 6 and 7 show three and four lobed castings used on drum spoolers equipped with detector-wires. A, shows a three-lobe casting; B, a four-lobe casting; C, detector-wire box; D, detector wires for double end spooling.

Instead of being wound on spools, the yarn is often wound on light, headless, paper tubes, on a quick-traversing machine. The

forms of the finished cheeses, or cones, as they are called, are various. A larger production at the winder may, in this manner, be obtained, and there is more yarn, for the same gross weight, delivered to the next process than when wooden spools are used. The help should be instructed that when there is any imperfection in the operation of the machinery which may, in any manner, affect the spooling, to let the man who does the general repairing know of it immediately. He in turn should attend to the trouble as soon as possible.

Figs. 8, 9 and 10 are brakes for stopping spools on drum spoolers when drop-wires operate. Fig. 8 shows position of brake when ends are holding up detector-wires. Fig. 9 shows position of brake when one of the wires drop. Fig. 10 shows parts of the brake. W, Fig. 8, shows brake stand; X, brake which may be of wood, fiber or other material; Y, is the spool; Z, the drum. W, Fig. 10, shows the stand; X, the brake.

Figs. 11 and 12 show metallic tensions with different style brackets. A, shows bracket; B, individual metallic cops between which the yarn passes; C, spring which holds metallic cups together; D, nuts for adjusting the amount of tension.

Fig. 13 shows ratchet arrangement for automatically turning friction rolls. A, ratchet wheel fastened to friction roll; B, lever which is loose on stud, C, and which is engaged by winding the traverse or spooler, turning the roll in the direction indicated by arrow; D, pawl which engages with teeth of ratchet-wheel.

Figs. 14, 15 and 16 show device for turning and transversing friction roll. Fig. 14 shows complete arrangement as attached to roll. V, Fig. 14, shows brackets attached to spooler; V, stud; W, double spiral groove; X, lever operated by spool traverse; Y, ratchet wheel; Z, friction roll.

Fig. 15 is another view of the bracket, V, showing the dog, O. This dog, O, fits loosely in a hole in the bracket, U, and also in the grooves, W, of the stud, V, which rest upon it. Fig. 16 is two views of the dog, O.

Fig. 17 shows the old style of spool spindle and Fig. 18 the new style.

ENGLISH NOTES

By Our Regular Correspondent

Bradford, Eng., Aug. 26, 1912.

In the census of production of British agriculture no very formidable figure is cut by the sheep. They are the most numerous of the farm animals of Great Britain and sales of sheep and lambs represent 30 per cent. of the proceeds of marketed livestock. Nine and a half million sheep and lambs were sold off the farms in 1908 and realized some $91,000,000. The sum of course includes any wool they were carrying, but it is the general practice to sell grown sheep shorn. The census excludes Ireland and relates simply to English, Scotch and Welsh sheep, 27,119,730 in number. It can be seen that farmers parted with about one-third of the flock during the year. The wool clipped from these 27 million sheep weighed an estimated 88 million pounds and realized some $13,000,000 in money. Allowing for the value of skin wool from the slaughterers, the item of wool for the year 1908 came to $15,500,000; which is to say one-fiftieth part of the aggregate $754,000,000 of miscellaneous farm produce. A sum of $103,000,000 represents the total sales of wool and sheep, so that in round terms sheep and wool stand for rather less than one-seventh of the whole yield. The census takes no stock of landholdings smaller than one acre and so necessarily understates the value of poultry and of vegetables. It more probably understates than overstates the cash value of wool raised, but these considerations do not vitally affect certain contrasts. Sheep farmers rightly think much of the price paid for wool and value the sum realized the more highly because it comes to them in a lump sum. But clipped wool forms a really small part of the output of British farming. Actually the yield from poultry ($25,000,000) is nearly twice as much, and precisely twice the value of the clip is realized by sales of fruit, flower and timber. Nearly twelve times more is obtained from dairy produce than from sales of wool. The sheep is very useful to the mixed farmer, but not principally because of the wool clip.

Much attention is being bestowed on the alleviation of labor troubles in this country and there are reasons to suspect that the Government has a scheme of compulsory arbitration in view. Evidence has been taken from textile manufacturers about means of avoiding and settling difficulties and particularly with respect to the making and keeping of collective bargains between employer and employed. The Bradford Dyers' Association deals with workmen practically all of whom are in labor unions and its collective agreements have served to keep the peace fairly well for a dozen years. The Association and the unions are both under a monetary guarantee to observe the terms of their bargain and negotiations are effected through a wages board jointly constituted of masters and men. There is a fine of $5 per head on those men who break faith and the fine is due from the individuals. This means failing the union is held responsible. Fines have been imposed and the chiefs of the Association regard them as a vital part of the arrangement. Where the employers are all bound fast in one organization and all the workpeople in another the ground is relatively smooth, but in practice these conditions do not often obtain. The manufacturers who make bargains and keep them have to complain of competitors who do not agree. Federated employers at large are coming round to the opinions expressed on behalf of the spinners' and manufacturers' associations in Huddersfield. These parties "do think that any agreement entered into by their associations should apply to employers who are outside." Their delegate would make it compulsory for outside employers to adhere to any agreement made. This idea of compulsion opens up large questions and there is perhaps more unanimity on the part of employers in wishing to make labor unions answerable under the law and in desiring the repeal of the measure making peaceful picketing legal. The statute allows "one or more persons to attend at or near a house or place, if they so attend merely for the purpose of peacefully obtaining or communicating information or of peacefully persuading any person to work or abstain from working." The text of the law lays repeated emphasis upon the word "peaceful" but it is easier to say that persons may collect together to prevent working than to ensure that only pacific means shall be used.

* * *

Theoretical projects for standardizing the quality of worsted tops have had no issue hitherto and are unlikely to have any in the future. Liberty to do as he likes conditionally upon providing a serviceable article is very dear to the topmaker and to manufacturers at large. It is, however, recognized that there should be uniformity in some things and consent to turn out sliver of standard dimensions involves no surrender. Nobody except the individual customer has power to require the topmaker to conform to any standard and the recommendations made by the Bradford Chamber of Commerce are simply those of a committee jointly representative of the interests affected. The standards recommended are for:

Prepared Tops

36s and below	8½	ozs. per 10 yards
40s and above	8	ozs. per 10 yards

Carded Tops

40s to 44s	7½	ozs. per 10 yards
46s to 48s	6½	ozs. per 10 yards

Combed and Carded Tops

50s and super 50s	6	ozs. per 10 yards
56s to 58s	5	ozs. per 10 yards
60s and above	4	ozs. per 10 yards

* * *

The bulk of British textile business is done through the old channels—the manufacturer selling to the wholesaler, who sells to the retailer, who sells to the public. The route from mill to home has been shortened in the case of some made-up goods, for nearly all clothiers buy from the mill and many have their own retail stores. Certain classes of manufacturers have gone direct to the retailer for long past. Carpet, flannel and blanket makers and most manufacturers of upholstery cloths go to the retailer openly and a good many more go furtively to the large department stores. The development is the natural outcome of the growing disinclination of wholesalers to order quantities for stock and their general disposition to make the manufacturer hold stock for them. Comparatively little has yet been done in the direct sale of fabrics from the mill to the

public, but there are manufacturing concerns with regular retail departments where small quantities can be bought for cash and there are manufacturers' warehouses into which anybody can walk and buy a dress length. We are a long way yet from large scale retail trading by manufacturers, but the movement is forward in that direction, not backward. It may be added as a general rule that the larger the concern, the more ready it is to get into direct touch with the ultimate consumer. The big undertakings lead the way in this matter, as they do in the branding and advertising of textiles. It is difficult to say whether the public buy more cheaply from the retailing manufacturer than from the regular draper. The impression among retailers is that they do rather better with the manufacturer than they did formerly with the wholesale merchant. Direct sale from mill to public has attracted little notice as yet, but it can be depended on to arouse very unfavorable remarks from shopkeepers in the mill districts. These last have thundered for years against the sale of jobs to employes, but local retail protestations amount to less than the silent, but effective, boycott which can be applied by wholesale dealers.

* * *

Although there are no strikes here over the question of fining weavers, there is a ceaseless discussion of the system of fines. These are peculiar to the weaving trade and are very little heard of outside the cotton business, in which operative weavers are closely enough organized to take good care of themselves. The existence of weaving fines is made the excuse for a demand for more factory inspectors, and inspectors are not favorites of English manufacturers, partly because their requirements are individual, one official condemning what another approves or allows. Various expedients for lessening the burden of fines are being tried. Some manufacturers, while maintaining the system, have arranged that the money shall be returned to the weavers at the year end, each weaver receiving an equal share. Others are trying experimental periods in which no fines are imposed. In the cotton business the bad work for which the fine is taken is usually attributed by the sufferer to bad material, but in the present state of trade the good weaver has a sound insurance against ill treatment in her own hands. She can leave and be sure of work elsewhere. The indifferent weaver gains also from the large demand for weavers' services by escaping fines which are really deserved.

* * *

A consignment of human hair figures in the list of shipments from the Bradford district to the United States. Considerable weights of pigtails from China arrived in Bradford to be scoured and made into tops. The material is too coarse to replace wool for regular purposes and its exact destination is not always clear. Probably the most of it goes in company with britch wool, camel hair and other coarse fiber into yarn for making filter cloths for oil presses, machine belting and so on. The material is a good deal pleasanter to deal with after scouring than beforehand. Certain firms make human hair a regular article of trade and deal in it by the hundred bales and more.

* * *

A factory inspection report on the illumination of textile factories lays down a number of general principles. It suggests that maximum efficiency in lighting requires a window area equal to at least one in ten of the floor area and requires also that the windows should command the largest possible area of sky. These desiderata are realizable in roof-lit premises, but not in side-lit rooms. In these latter it is recommended that the light be allowed to reach the center or darkest point of the room, with the least possible destruction. Spinning frames, it is urged, should be placed across the room in such manner that there is a window light at the end of each alley. Of artificial lighting the report says: (1) the light should be adequate to the work carried on and (2) be arranged so as to cause no glare and no shadows. There is a hint that the intensity of light ought to be adjustable to suit the fineness and color of the material in work for the time being. Bad lighting is blamed by the labor unions for causing accidents in

mills and it is possible that the publication of the report is the preface to some official action.

* * *

A large card issued by the Bradford Chamber of Commerce as a warning to wool growers is printed in several languages for circulation in all supplying countries. It shows a sample of the abominated harvester twine as an illustration of what not to use in connection with raw wool and a sample of neat glazed and colored flax thread as a suitable tie. Below are two samples of blue worsted serge, one of them defaced by large slubs of undyed sisal fiber and the other showing the fabric as it is wanted to be and would be but for thoughtless packing. An extreme case has been chosen to illustrate the point and make sure that the guilty shall see the damage done. In practice it is not the large knots of foreign fiber that give most trouble. The individual filaments which escape from these and become mixed inextricably with the wool are the ones most difficult to see beforehand and remove neatly after weaving and dyeing. A handful of harvester band in a bale is bad in itself, but the thousands of bits from that handful are thousands of times worse.

* * *

Circulars have been sent out announcing a general advance in piece dyeing charges to date from January 1 next. The pretext is the general increase of expenses and notably the cost of the social legislation promoted by Lloyd George. His compulsory insurance measure is now in operation and operatives are paying their 8 cents and employers their 6 cents a week towards the sickness benefits which are to come into force next year. Mill mechanics and carpenters, like their fellows in the engineering and building trades, have also compulsorily to be insured against unemployment, although in point of fact the repairing staffs are hardly ever unemployed. The scheme of insurance is going to work and also it is going to be amended, but probably nothing can prevent the system from costing more and more as time passes. Already some persons are saying that insurance must be free just as education is free. A minority of manufacturers are making insurance free to their workpeople by paying the worker's contribution as well as their own, but the principle does not command itself universally. Comparatively few manufacturers have taken the chance to encourage their people to earn the cost of their contribution by a bonus system, although there is room for bargains advantageous to both sides.

* * *

To judge from surface indications, sales of such American textiles as "Holeproof" stockings and "Serpentine" cotton crepes would seem to be progressing in this country. The stockings are largely advertised in the shop windows and the crepe has received the assistance of large advertisements in the press. A few sundries of American origin are to be seen in the shops, for example an ironholder for domestic laundry use with a knitted cover and an asbestos lining. Retailers of such articles as these explain that the American manufacturer allows a larger commission to salesmen than British makers do, with the consequence that the goods are very energetically pushed. As a pure matter of cost it is probable enough that similar ironholders could be made in this country to sell at the same price (5 cents), but the American article occupies the field. It is to be inferred that the business in stockings and cottons owes something to the policy of maintaining a fixed price and a good profit margin for the seller.

* * *

The arrests of well-known Bradfordians in Boston have aroused a passing interest in Yorkshire, where the general purport of the Immigration laws is well understood. Workpeople from the textile district have been turned back or detained before now and at least one other Anglo-American manufacturing concern has been smartly fined. It is certain also that the law has been infringed during past years in some other cases and that emigrants have received passage money and orders to disavow any contract of engagement. But there are no "schools of instruction" for the importing of the art of deceiving immigration officers and

there is no kind of evidence of any "gigantic plot." On the contrary emigrant bookings to the United States from the Bradford district have fallen off and only average about twelve a week and these persons are by no means all textile workers. Sensible people will readily distinguish fact from fiction in the excited newspaper accounts. Complete evidence is always difficult to obtain, but from the information available it is probable, at least, that manufacturers or employers are not the only offenders against the law. So far as can be learnt, some textile workers have gone out with funds advanced and promises given, not by the prospective employer, but by their own friends or relations already at work in the United States; and some of these have made a long detour through other mills before arriving at the predestined one containing their friends.

A HAND BOOK OF WEAVES

By G. H. OELSNER, Director of the Weaving School at Werdau.

Translated and Revised by Samuel S. Dale

This Series began in July, 1911

Diversified Twills

Figs. 694 to 722 show effects obtained on twill weaves by adding or removing risers. Fig. 710 is the motif for Fig. 709; Fig. 712, the motif for Figs. 714 and 715; Fig. 716, the motif for Fig. 718.

The spotting in several of the other designs is arranged as follows: Figs. 708, 711, 713, 8-leaf satin; Figs. 717, 719 and 722, 5-leaf satin.

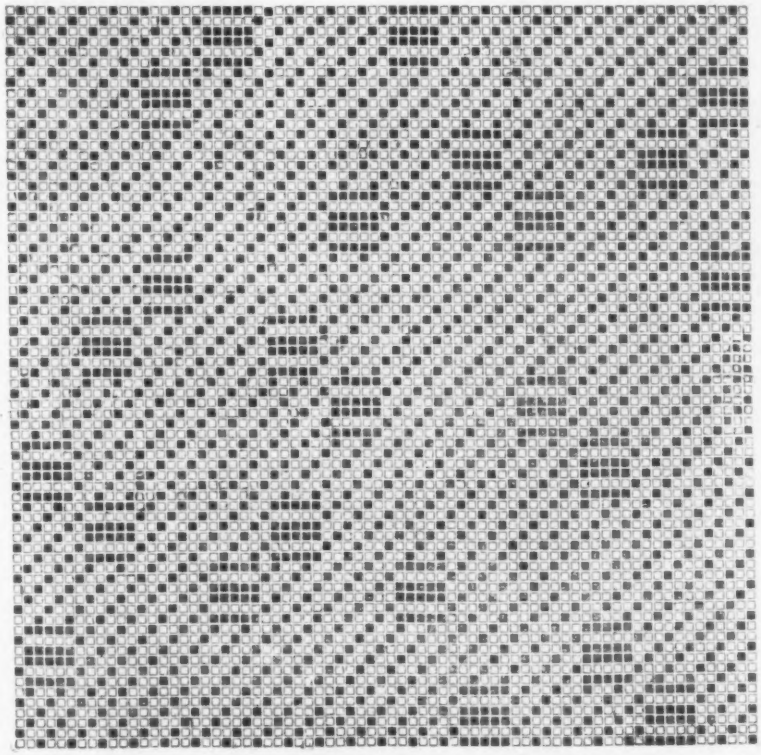

FIG. 709.

Diversified Satin Weaves

Weave designs formed on a satin ground are shown at Figs. 724 to 729.

Diversified Rib Weaves

Very pleasing effects can be obtained by

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grouping floats on a diagonal rib weave, Figs. 730 to 740. Particularly suitable for such a ground work is the 9-leaf weave shown at Fig. 731, from which are derived Figs. 734, 735, 737 and 738.

FIG. 710.

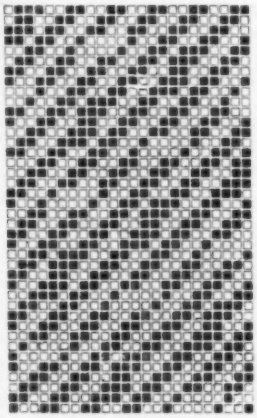


FIG. 711

FIG. 712

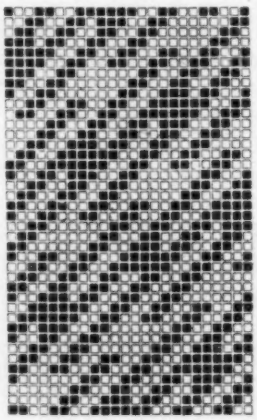


FIG. 713.

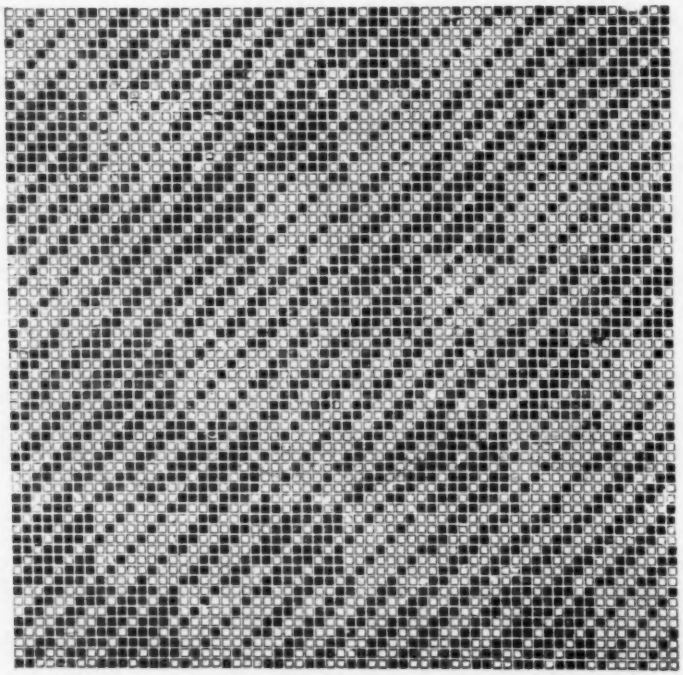


FIG. 714.

Honeycomb Weaves

Attractive effects are obtained by arranging groups of warp and filling floats with a plain weave to form raised and sunken squares, the face of the cloth resembling a

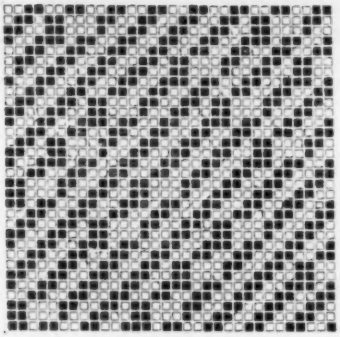


FIG. 715.

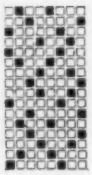


FIG. 716.

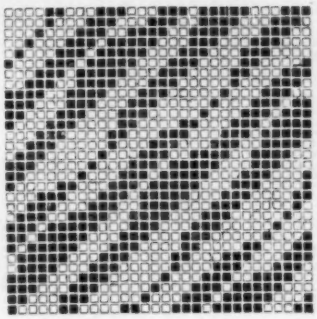


FIG 717.

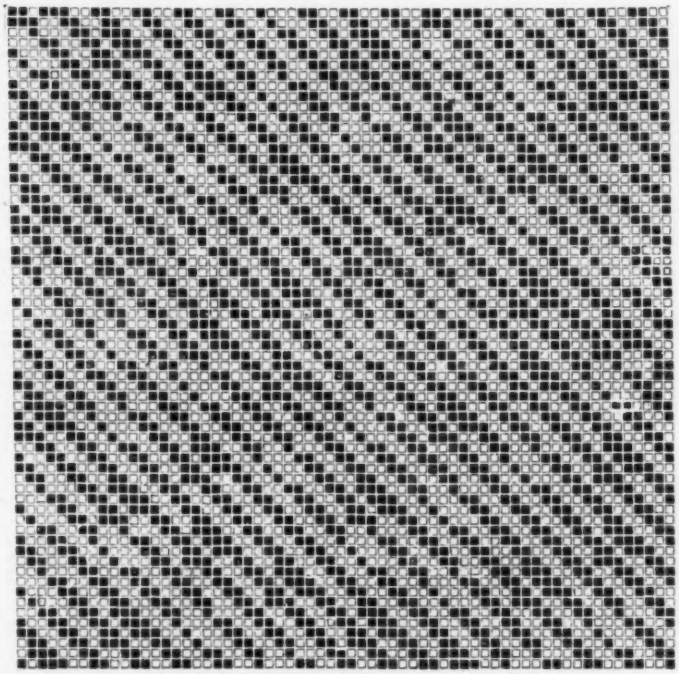


FIG. 718

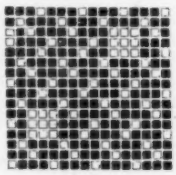


FIG. 724.

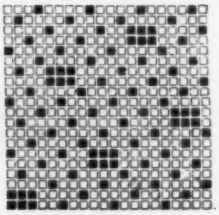


FIG. 725

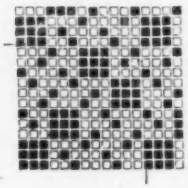
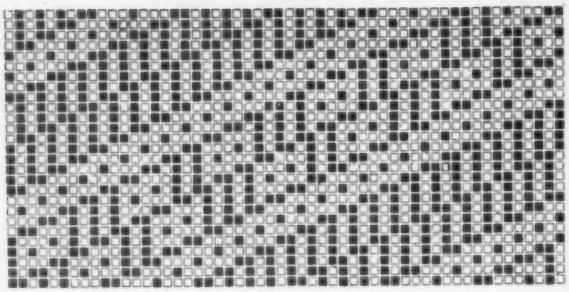


FIG. 726

FIG. 735.



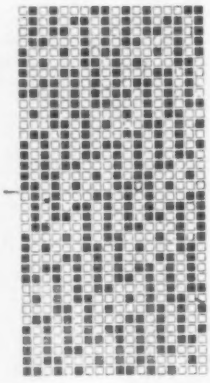


FIG. 737.

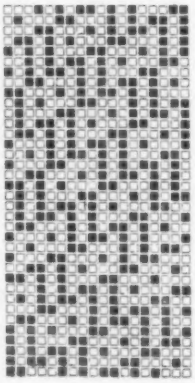


FIG. 738.

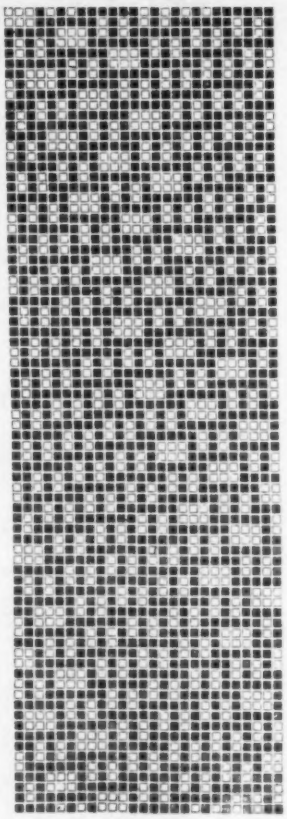


FIG. 736.

FIG. 749.

FIG. 750.

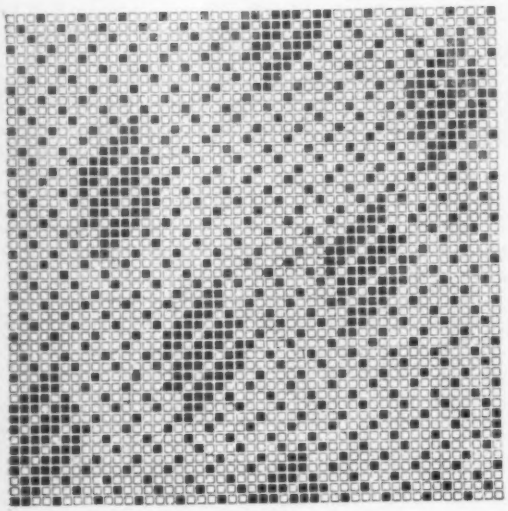
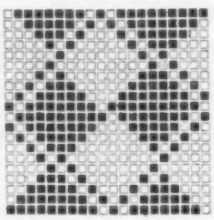


FIG. 729.



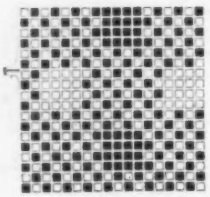
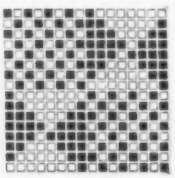


FIG. 751.



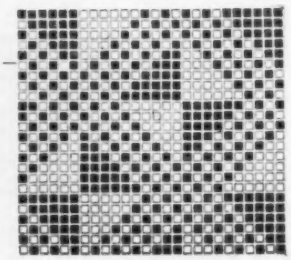


FIG. 752

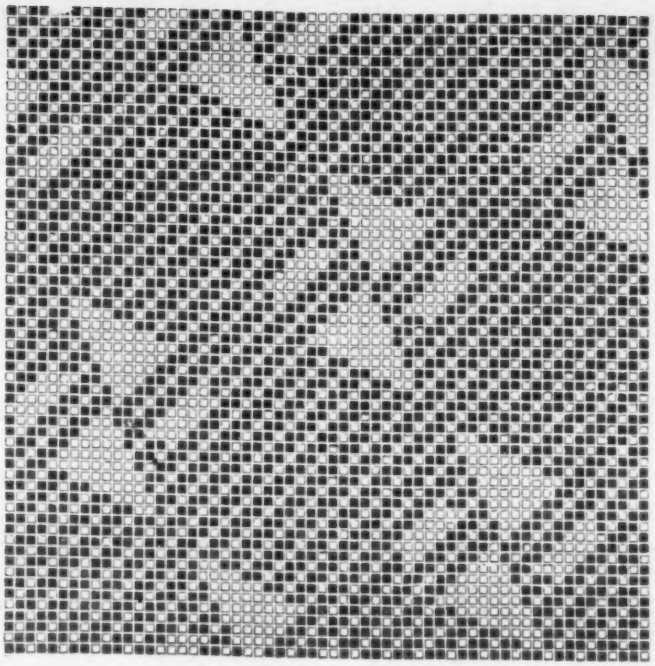


FIG. 722

FIG. 730.

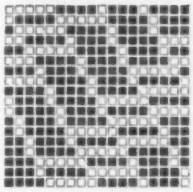


FIG. 731.

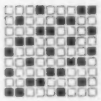
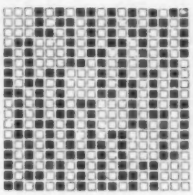


FIG. 732



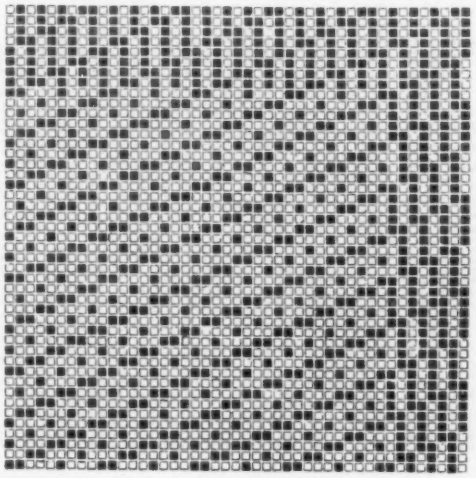
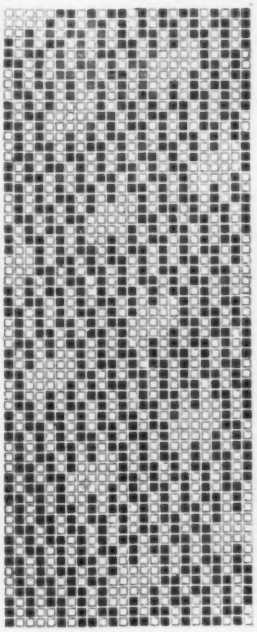


FIG. 734.



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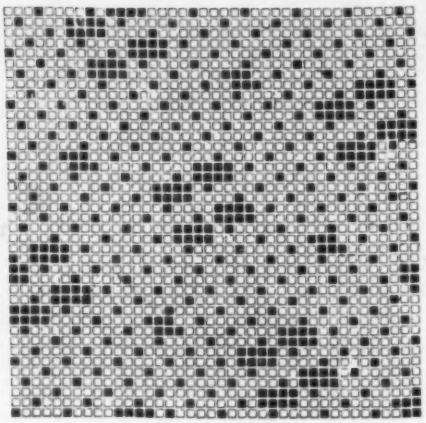


FIG. 727.

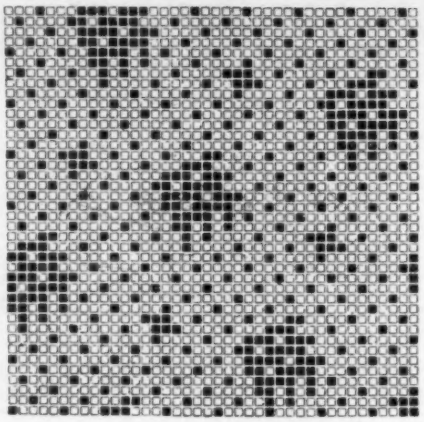


FIG. 728.

FIG. 741.

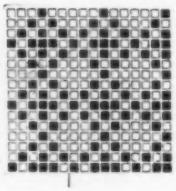


FIG. 742.

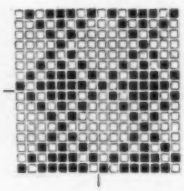


FIG. 743.

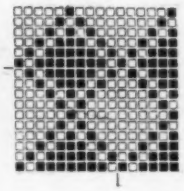
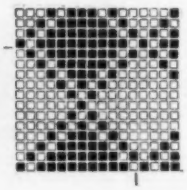


FIG. 744.



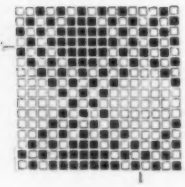


FIG. 745.

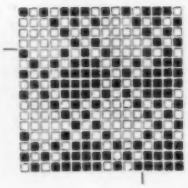


FIG. 746.

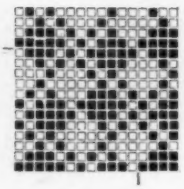


FIG. 747

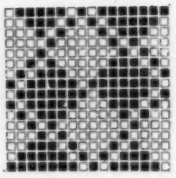


FIG. 748.

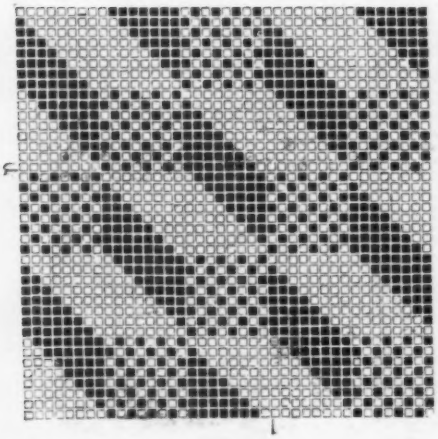


FIG 753

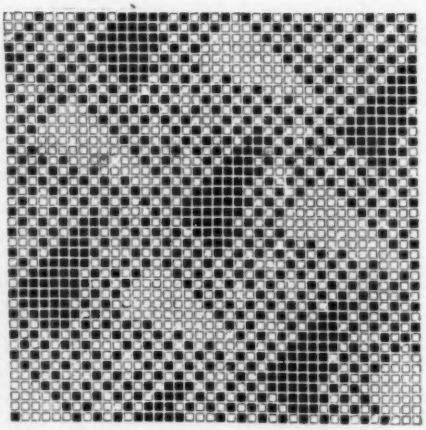


FIG. 754.

honeycomb. The honeycomb effect is specially pronounced when coarse cotton or zephyr yarn is used.

The ordinary honeycomb weaves are 4, 5, 6 or 7 harness pointed designs, Figs. 741 to 745. Modified forms are shown at Figs. 747 to 749, in which the honeycomb square is developed by two threads in each direction. Similar effects are obtained by throwing pronounced warp and filling floats on a plain weave, as shown at Figs. 750 to 755.

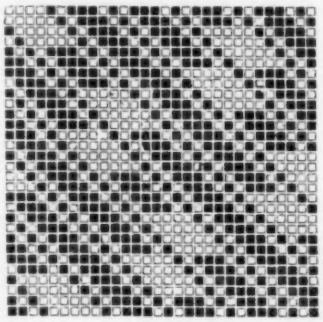
ANALYZING SILK FABRICS

BY JAMES CHITTICK

When a buyer of silk goods is considering the relative merits of two fabrics of similar appearance and price, he is often at a loss to determine which is really the better quality, and is as likely to select the less worthy one of the two as not. The points that should be considered in arriving at a correct judgment of silk goods are, consequently, of great importance and I shall give in this article a description of the construction methods of analysis, so as to assist any inquirer in getting as near to the facts as possible.

First of all, it is to be presumed that the fabrics under consideration contain no "invisible values;" that is, that they be so constructed as to show all the value that their cost permits; and that therefore their real merit will be in relation to their cost values. The features that we understand by the word "quality," include appearance, fineness, strength, fastness of color, luster, finish, touch or "handle," thickness, etc., and in silk whether weighted or not. Fine yarns cost much more to prepare than coarse yarns, so, weight for weight, the cloth composed of the finer yarns has more value. The threads, therefore, both warp and filling ways, should be counted under a magnifying glass, and

FIG. 719.



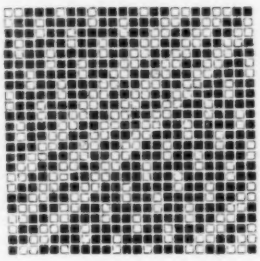


FIG 721.

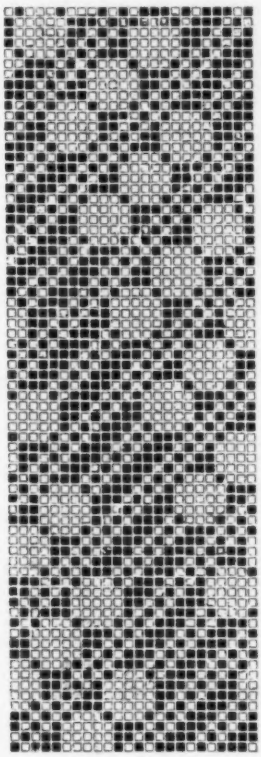


FIG. 720.

their number, size and character observed. In closely woven fabrics this is not so easy, and satin warps of dense construction present particular difficulties. If one understands anything about weaves, and can identify the weave used in the cloth, the work is simplified by counting from repeat to repeat of the weave. Thus, in an 8-shaft satin, which binds each filling pick once in each respect of eight warp ends, you count along one pick the number of times in an inch it is caught by the warp, and, multiplying this by the eight ends per repeat, gives the ends per inch. In such goods as piece-dyed cotton-back satins it is very hard to count them in any other way.

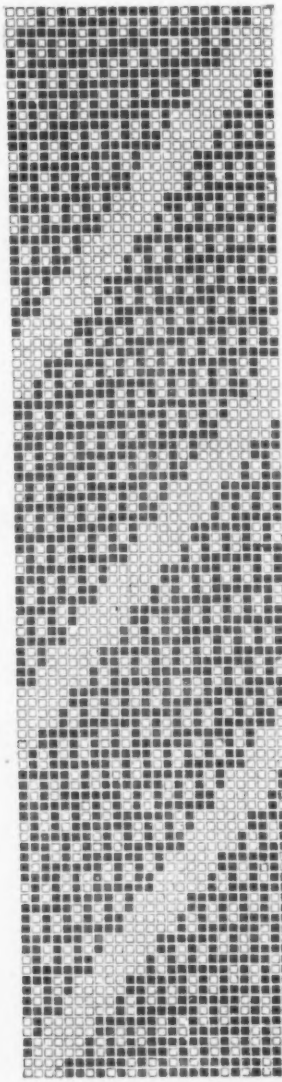


FIG. 739.

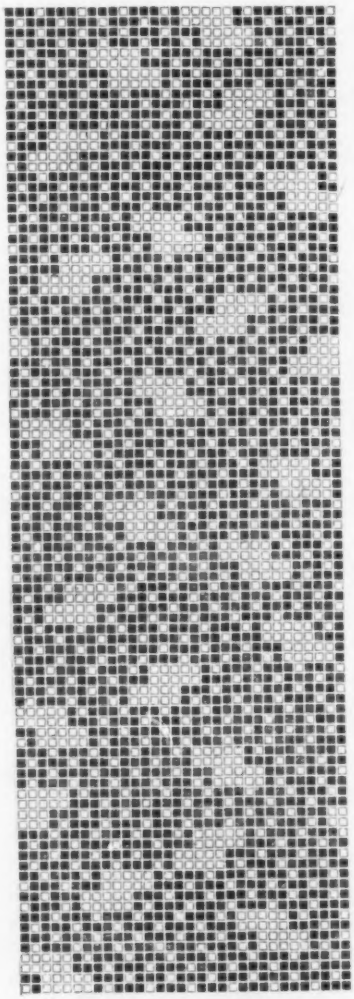


FIG. 740.

When baffled in the attempt to count, one can, as a last resort, cut out a piece of the cloth with exactness to a given size, and then pick out the threads separately and count them, under a magnifying glass by preference. For warp, a strip one-half inch wide and three inches long is a convenient size, and for filling a strip one-half inch long and three inches wide. The twist, when hard twist yarns are used, as in crepes, grenadines, chiffons, etc., is to be considered, as the greater the twist, the more the cost of the throwing. Thus, a crepe twist of 72 turns per inch costs materially more than

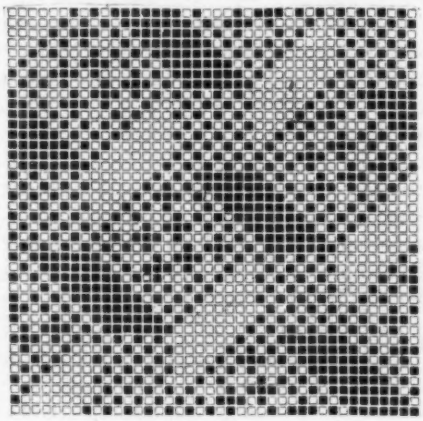


FIG. 755.

one of 60 turns, besides being thicker on account of the greater take-up or shortening due to the twist, and hence represents more value.

Twist can only be determined by the use of a twist tester, a very useful appliance to have, and tests can be easily and accurately made. Luster in a fabric will be affected by the character of the raw material used, the manner of its preparation, the structure of the cloth, the consequent position of the fibers, and the finish given to it. Faulty manipulation is sometimes responsible for poor results from excellent raw material, but, generally speaking, the more brilliant and lustrous the cloth is the higher the quality of the material employed.

Finish is different from luster, as it may add to it or detract from it, or may make a luster where none previously existed. Such a luster is generally short lived and may be got by the use of gums, waxes and other finishing materials used in the size. For most silk goods, the sizing mixture is atomized into a very fine spray or vapor, and in that shape settles on the goods like dew, being subsequently dried and softened. For others, such as grenadines, nets, etc., the size is often pressed right into the fabric by

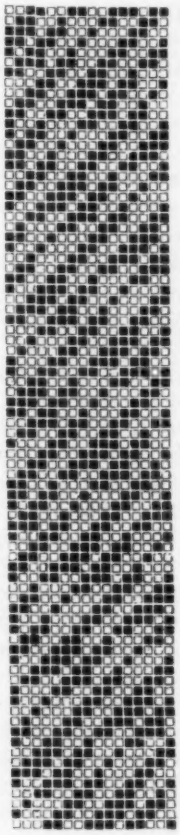


FIG. 723.

squeeze rolls, and the gum in such cases forms a material part of the body of the finished cloth. When comparing goods of this class, or in fact any class, but particularly those that appear to have appreciable dressing in them, cut fair size samples of the goods, weigh accurately, and then boil them for a while in plain water to get rid of the size, all the materials of which are usually

soluble in water. Then dry them out and allow them to hang up for a few hours, or over night, in a normal atmosphere and weigh again. The loss in weight will show the approximate amount of size that each contained.

The matter of strength, for ordinary purposes, can be as well tested by trying to break the goods, warp ways, and filling ways, between the fingers and thumbs, as any other way. If it resists such breakage entirely it is very strong, if it breaks with difficulty it is commercially sound, if it breaks without much stress it may do for some purposes, but not for others, and if it gives way with ease it is tender or rotten.

The "handle" of a cloth will depend upon construction, materials and finish, but so far as this, and so far as appearance are concerned, the cloth that feels the best, and looks the best, is the best, and on these points the buyer's own judgment is his best guide.

Thickness, which presupposes greater body and more material used, is generally a sign of greater value, but thickness is often a drawback for particular purposes, and a coarse, thick cloth may be likely to cost less to make than a fine but lighter one.

Fastness of color always implies the question, To what is it to be fast? There is resistance to alkalies, to acids, to water, to light, to perspiration, to washing in soap and hot water, etc. Various articles of manufacture must meet one or the other of these conditions. Umbrella silks, socks, shirtings, hat bands, coat linings and dress materials, embroidery silks, have each their peculiar requirements. No dye is fast to every influence. Buyers of such goods can expose them to the influences they are supposed to be fast to and observe the results.

Crocking of colors can easily be detected by smart rubbing with a white cloth. Bleeding, due to excess of loose color remaining after dyeing, can be observed by wetting and soaping a sample and working it for a few moments between the fingers, and then squeezing out the water which will be dissolved if the color bleeds.

The determination of weighting is quite another proposition. It is true that a simple burning test will show if a sample is pure dye or weighted. Silk burns like other animal fibers, the hair of the head, for instance, and crisps up as it burns. If weighted, it will leave an ash having the semblance of the fabric, and the more the weighting the solider will this ash be. The color of this ash is also some guide to the character of the weighting agent. The warp, or the filling, or both of them may be weighted. Burning a sample of each separately will be sufficient to show if loading is present. Just how much a cloth has been weighted it is quite impossible to tell without very complicated chemical tests. By observing the size of the silk and the number of cocoon filaments of which it is composed, and then comparing the size of the dyed yarn with samples of known weighting, an approximate figure may be arrived at. Piece dyed goods are not weighted, so crepe-de-chines, and other crepy cloths, cotton-back satins, liberty satins, foulards, shantungs, etc., are unweighted. Most skein dyed goods are considerably weighted, the organzine being generally 16 to 18 ozs. for colors, and from 20 to almost 30 ozs. for blacks, and the fillings 22 to 24 ozs., with occasional excessive weightings of 24 to 26 and 26 to 28 ozs. for colors, and from 26 to 40 ozs. for black and brights, and, in extreme cases, as high as 60 ozs. for black samples. There are also a few pure-dye skein dyed silks made.

The warps of print warp goods are usually pure dye, but some of the cheaper ones have printed warps of weighted silks. These silks are not usually steamed and washed after printing. The colors, not having been steamed, may crock, or rub off, but the interwoven filling minimizes this defect. In the examination of fabrics it is a great help to have a knowledge of the usual constructions employed in manufacturing. Taking raw silks, we find in common use the sizes, 12 to 14, 13 to 15, 14 to 16, 16 to 18, and 20 to 22 deniers, the 13 to 15 denier size being the silk of great general use for skein dyes, and the 14 to 16 silk for the warps of piece dyes. When the silk worm spins its cocoon, the thread emitted is really a double thread, the two filaments cohering by means of their natural gum, while appearing like a single

end. Cocoons of various races have varying sizes of filaments, and cocoons of the same race, but from different districts, or even those bred in the same district, will vary. Therefore, after the necessary stock of cocoons has been purchased by the reeler, he has them carefully sortd and the size tested so as to enable him to reel his raw silks with accuracy. In a 13 to 15 denier silk, 6 cocoons are usually reeled together, the threads cohering by the natural gum which has been softened by the hot water in which they are floated while being reeled. If finer cocoons were used it might take 7, and if coarser were employed 5 might be used. Again, some of different sizes might have to be brought together to give a particular size, so there is no hard and fast rule on the subject.

It must be observed that Canton cocoons are much smaller and finer than those of other races, and it takes more of these to make a given size. Canton silks are generally hairy, and are reeled mostly in 14 to 16 denier sizes, with not a little 22 to 26 denier size, for use in the filling of cotton warp goods.

Tussahs, on the other hand, are coarse, the standard qualities of 8 cocoons reeling about 34 deniers. There are also lower grade tussahs made with 16 cocoons, and a few high class ones of 4 cocoons. The very irregularly reeled native Chinese silks known as "Tsatlees" size about 20 to 26 deniers. In addition to the commonly used size of 14 to 16 deniers for raw silk warps for piece dye, there is quite a little 20 to 22 used, and 13 to 15 has been lately coming more into use, while 12 to 14 is only occasionally seen. As a preliminary for skein dyeing, the raw silk has to be twisted, or "thrown" as it is called. In warp purposes two threads are usually joined together, while, for fillings, 2, 3, 4, 5 and 6 threads are common, 2 and 3 threads being the most usual. Organzine threads, being twisted in the single before being doubled and again twisted, are readily divided into their single ends. Tram is much more difficult to separate properly, as the component threads have no first time twist and they all seem to run together. However, a practiced hand, after a few trials, can generally divide the thread into its original ends. It is a great convenience to have on hand a series of sample bobbins of various sizes of tram, organzine and raw silk, and of the tram and organzine to have bobbins of all the different weightings commonly used, as well as bobbins of standard sizes of cottons, worsteds, etc. When, therefore, any threads are being examined, comparisons of an accurate sort can be made with these reference spools. A convenient way of making the observation is to pick out, say, 10 or 20 threads from the sample and arrange them in a bunch, and, from the spool of standard silk that looks nearest to it, take off a length that will make a bunch of threads equal to the other in number. Then loop the bunches across each other, and, drawing the ends tight, begin and twist them till each side shows up in a firm, solid twist, and, when so many ends are assembled, any difference in size is at once perceptible. If a difference be found, then compare with another standard sample till one is found that corresponds. It would hardly be possible to say whether a certain thread was made of a 13 to 15 denier silk, weighted to 28 to 30 ozs. or of a 14 to 16 size weighted to 26 to 28 ozs., but the presumption would be in favor of the size and weighting most commonly used.

In other materials most generally employed by silk manfuacturers are spun silks (or schappe), cotton and worsteds. The single spun silk that comes on cops is mostly 1/60s (cotton count), with some 1/80s. Other sizes find some sale also. Spun silks are also made from tussah stock. When fine count cottons are needed for warp purposes, the sizes of 2/78s, 2/100s, 2/120s and 2/140s are used, particularly 2/78s and 2/120s. The peculiar count of 2/78s was devised to avoid being penalized by a heavier duty which began at 2/80s size. Coarse two-ply cottons, largely used for filling, but sometimes for warp, are 2/40s, 2/50s and 2/60s. Hard-twist, three-ply cottons, for filling for goods to be moired, are mostly bought in the sizes of 3/24s, 3/30s and 3/40s. Single filling yarns on cops, for use in cotton back satins, are principally 1/25s, with occasional lots of 1/30s.

Worsted yarns are nearly always used for fillings in such goods as good quality poplins, bengalines, etc., and, while some is used in ordinary twists, much of it is wanted heavily twisted, and, if the goods are to be moired, three-ply yarns will be sought. Sizes frequently used are 2/40s, 2/50s, 2/60s, 3/60s, 3/70s, 3/80s and 3/90s. There is some minor use of tinsels, polished and glazed cottons, fancy knotted or looped yarns made of various materials, silk noil yarns, ramie, etc., and the use of artificial silk is largely increasing, but it would be impossible to generalize on the sizes used of these.

The foregoing data, however, will cover most of the points that one should consider when examining or dissecting silk fabrics.

DRAFT PROPORTIONING

BY STEUBEN

To one who has had considerable experience in the mill in working drafts, speeds, etc., the question of determining what size sliver to run on drawing to produce a given yarn with good running drafts on the frames, is easily settled. His experience is enough to enable him to know approximately what he wants. To one who has not had a wide experience on numbers of varying sizes or who has not had the necessary experience in the mill, the question may be puzzling. The total draft between any two points in the processes of yarn manufacture is the product of all the intermediate drafts between these two points. I will assume that the working drafts are: Slubber, 4; intermediate fly frame, 5; fine fly frame, 6; and spinning frame, 10.5. Then the total draft is 1,260, the product of the four intermediate drafts. If any layout calls for a total draft between these two points greater than 1,260, the intermediate drafts will necessarily be increased. The reverse is also true.

If a given count of yarn is to be spun from a given count of sliver, it is easy to determine the total draft necessary. Reduce the grain sliver to hank sliver by the following rule: Divide 8.33 by the weight in grains, of one yard of sliver. Find the total draft by the following rule: Multiply the counts of the yarn to be spun by the product of the doublings on the frames and divide the product by the hank sliver. We can determine in this way whether the intermediate drafts are higher or lower than the average. We will assume that it is desired to spin 30s yarn from a 50 grain sliver on the back of the slubber, using three fly frames and double roving on the spinning frame. What would be the intermediate drafts?

$8.33 \div 50 = .166$ hand sliver. Then $(30 \times 2 \times 2 \times 2) \div .166 = 1{,}445$, total draft.

The drafts on the four frames are above the normal figures given. If it is desired to find the effective draft, this can be done by dividing the total draft by the product of the doublings:

$1{,}445 \div (2 \times 2 \times 2) = 180$, effective draft.

Then the hank sliver multiplied by the effective draft will give the counts of the yarn spun:

$180 \times .166 = 29.88$ or 30s yarn.

The effective draft is the amount of draft that would be required to reduce the sliver to the desired counts of yarn if there were no doublings, or it is the number of yards of yarn spun on the spinning frame for each one yard of sliver fed into the back of the slubber.

Having selected 4, 5, 6 and 10.5 as the average normal drafts for the four frames, we can distribute or divide the total draft among the four frames by the following rule: Multiply the fourth root of the total draft to be divided by any ratio and divide the product by the fourth root of the product of the ratios. The result will be the draft for the frame. The rule can be explained in a formula which will show more clearly the steps taken:

$$\sqrt[4]{(\text{Total draft} \times \text{ratio})} \div \text{Product of ratio.}$$

The fourth root of any number is the result of getting the square root of the square root of the number.

The product of the ratio is

$4 \times 5 \times 6 \times 10.5 = 1{,}260$. The fourth root of $1.260 = 5.95$.

The total draft, as found above, is 1,445. The fourth root of 1,445 = 6.16.

Using the ratio of 10.5 for the spinning frame, we get the spinning draft as follows:

(6.16 × 10.5) ÷ 5.95 = 10.87, spinning draft.

For the fine frame:

(6.16 × 6) ÷ 5.95 = 6.21, fine frame draft.

For the intermediate:

(6.16 × 5) ÷ 5.95 = 5.18, intermediate draft.

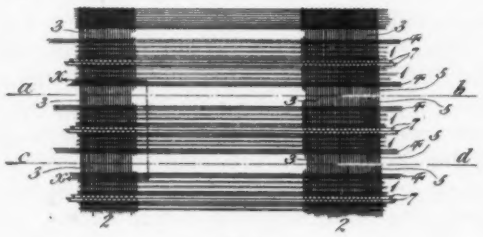


FIG. 1.

For the slubber:

(6.16 × 4) ÷ 5.95 = 4.14, slubber draft.

Multiplying these four drafts together gives a total of 1,447, which is only two points variation from 1,445.

Where the total draft is high, this excess will be proportionately distributed over the four intermediate drafts and will show no excessively high drafts. Herein lies the advantage in using this rule to map out the drafts. If the total draft was lower all the intermediate drafts would be lower and, if it were necessary, a heavier sliver could be used. Another advantage of this method is that in no case will the result show an excessive draft on one or more frames and low drafts on the others.

The numbers 4, 5, 6 and 10.5 are not arbitrarily fixed. When more draft or less draft is considered advisable on a frame, the ratio for that frame can be changed. For example, 10 or 11 may be used in place of the 10.5 as given for the spinning frame.

When running on low counts and the intermediate frame is not used, the ratio for the frame (5) is thrown out, and the cube root is substituted for the fourth root. If using single roving in the spinning, with two or three processes of fly frames, change the ratio 10.5 to 8 and modify the formula to suit the number of frames, as noted above.

AN IMPROVED CHENILLE CONSTRUCTION

The illustrations show a flat chenille having a pile extending from each edge. It has recently been patented in this country and is intended for rugs and carpets in which the pattern and colors will be the same on both sides. Fig. 1 is a plan of the fabric from which the chenille is obtained, portions of the weft threads being omitted. Fig. 2 is a sectional view along the line, xx, Fig. 1. Fig. 3 is an elevation of the chenille in twisted form as it comes from the shuttle.

The weft threads, 2, are united to the warps and in weaving the fabric, shown in Fig. 1, floats, 3, are formed in the wefts at suitable points. A plurality of warps threads, as at 4, are formed close together forming a selvage or binder where the floats of the weft begin. After the fabric is formed, as shown

FIG. 2.

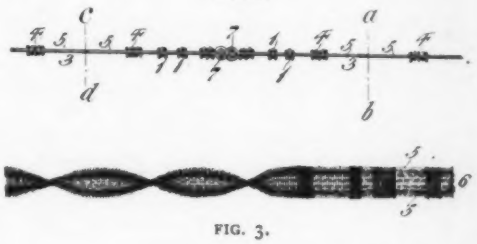


FIG. 3.

in Fig. 1, the floats are cut on lines a—b, c—d, the ends of the wefts which project beyond the warps, forming the pile, 5. A flat chenille, as shown in Fig. 3, is thus formed, having the flat body, 6, with the pile, 5, extending from each end. If desired at suitable points in the fabric the fillers, 7, are inserted, which serve to strengthen the chenille and make it suitable for heavy work. The chenille so formed is woven in the rug, carpet, or curtain, giving a durable construction with a pile on both sides.

By placing different colors in the fabric the resultant chenille is formed the same as shown to the right in Fig. 3, so that any pattern which may be desired in the rug can be made with the chenille.

Questions and Answers

Under this head we undertake to answer, free of charge, to the best of our ability, questions pertaining to textile matters received from any regular subscriber to the TEXTILE WORLD RECORD. Questions should be stated as briefly and concisely as possible. Inquiries pertaining to textile processes, machinery, improvements, methods of management, the markets, etc., are especially invited, as well as any legitimate discussion on the views expressed. All inquiries must be accompanied by the name of the person inquiring, not for publication, but as an evidence of good faith.

If the question is not of general interest to textile readers and involves expensive investigation, a charge covering the cost may be made, of which the inquirer will be advised before any expense is incurred.

SIZES OF SWEATER COATS

Editor Textile World Record:

We are desircus of obtaining an accurate standard of measurements for ladies', men's and children's sweaters. Manufacturer (2068).

The following scale of sizes of sweaters are accepted as being correct. These are of course subject to change as regards lengths of the ladies' goods, as these are being bought in lengths of from 27 inches on 40 up to 39 inches and longer:

Men's Coats

Sizes	Width	Length	Sleeves	Armhole
34	15	25	19	9
36	16	26	20	9½
38	17	27	20	9½
40	18	27	21	10
42	19	27	21	10
44	20	28	22	10½
46	21	28	22	10½

Ladies' Coats

Sizes	Bust	Waist	Length	Sleeves	Armhole
34	16	14	27	20	7
36	17	15	28	20	8
38	18	15	29	21	8
40	19	16	30	22	9
42	20	17	31	22	9
44	21	18	32	22	10

Misses' Coats

Size	Width	Length	Sleeve
20	10	14	16
22	11	16	16
24	12	18	17
26	13	20	17
28	14	22	18
30	14½	24	18
32	15	25	19
34	16	26	19

The armholes for the children's lines should be as follows:

20	22	24	26	28	30	32	34
4 in.	4 in.	5 in.	5 in.	6 in.	6 in.	7 in.	7 in.

As regards the cuffs, there does not seem to be much difference in the width of the various sizes of either men's or women's goods, but naturally there must be some slight difference as the cuff in most lines is simply the plain stitch of the sleeve portion and will vary according to the width of the sleeve; most of them run from three to four inches in width.

There however is a difference in the length of the cuffs. The cuffs on the men's coats are made about three to three and one-half inches in length, while in most lines of ladies' goods they are made from six to seven inches in length, those on the ladies' garments being intended to turn back.

Fillmore.

TESTS FOR QUALITY OF GOODS

Editor Textile World Record:

I am a dealer in hosiery, and would like to have information as to the tests used for determining quality of silk goods, both loaded and unloaded. Manix (2066).

Unfortunately, there is no short cut to these determinations. The most experienced manufacturer could not tell within 10 to 20 per cent. of the cost or value of any particular piece of goods, unless such as he was handling every day. To determine the relative quality requires careful counting of picks and ends, and accurate observations as to the size and character of such threads, a knowledge requiring years of practice to acquire. Anyone can make a few simple observations, such as wetting a sample and judging by its stickiness if it has been heavily gummed or not; burning a sample, or burning the warp and filling separately, and judging from the ash remaining if it has been lightly or heavily weighted. An unweighted, or pure dye silk, when burnt, crisps up like wool. A weighted silk leaves an ash in the semblance of the fabric, and the more the weighting, the heavier the ash. The color of the ash helps to indicate

what weighting agent has been used. The weight of the finishd cloth per square yard can be found, and strength tests made of cuttings, both warp and filling ways. Colors supposed to be fast for different uses can be tested out. Any different material in the fabric, cotton, worsted, etc., can also be looked for and observed. Then observations, coupled with the touch and appearance of the goods, are about all that any untrained person can make.

James Chittick.

PREPARING BLEACHING LIQUOR

Editor Textile World Record:

What is the best way to prepare bleaching liquor for the bleach vat? We want the most modern and up-to-date method. Sometimes we have yarns that are somewhat red in color and in going through the boiling and bleaching process we find this color will not bleach out white. Please give us a recipe for a boiling compound to use with a regular caustic soda boil that will remove this yellow color? Clifton (2070).

The best method of preparing bleaching liquor is by using the electrolyzer. The liquor is free from sediment and can be regulated to produce a uniform strength of bleaching liquor. Another very good method of preparing bleaching liquor is to mix the chemic powder with soda ash, thus producing sodium hypochlorite, which gives a better white than the ordinary bleaching liquor, and allowing the goods to remain in the chemic bath a little longer with less risk of tendering. From the information "Clifton" gives I feel sure that the trouble is not caused by the method of preparing the bleaching liquor. The trouble is caused either by the goods not being bleached long enough or by making the liquor too strong. It is not necessary to use any bleaching compound, soap, or bleaching assistant in a caustic boil as this has a tendency to aggravate the trouble. On one occasion I had to bleach a lot of cotton similar to that which "Clifton" refers to. I bleached it, took it back and rebleached it, but all to no purpose. I drew this to the attention of the cotton sampler, who was an expert on cotton, and he informed me that the cotton had grown on swampy, marshy ground and was called "black" cotton. When this cotton is held up to the light it gives the reddish tint "Clifton" complains of. The same result will follow if the chemic is used too strong, especially in a caustic bleach, as this has a tendency to force the bleach. The cause of the difficulty might be traced to the kier. If the liquor drawn from the kier is very dirty and discolored "Clifton" should make a second weak mixture of soda ash and boil again for three or four hours, noting the second liquor that is drawn off. This method requires less chemic than does one boil and produces a better white without adding either soap, resin or bleaching assistant. A compound will not work as well in a caustic boil as in a lime boil. If the following method is carried out good results should follow: In the first liquor use a 1 to 2 per cent. solution of caustic soda according to quality of goods to be bleached. Boil five to six hours. Flush the kier for half an hour and mix a 1 to 1 1/2 per cent. solution of soda ash and boil for another three to four hours. Draw off the liquor and wash well using a chemic solution of not higher than 1° Tw. Let the goods age for three to five hours and sour off with an acid solution of 1 1/2° Tw. When the goods have aged for a couple of hours to neutralize the chemic, wash off and finish. If the chemic is mixed with soda ash I feel sure that a better and more lasting white which will not turn yellow with age will be the result. Alpha.

SHRINKING CANVAS

Editor Textile World Record:

In shrinking canvas we put the goods in water and thereby remove much of the finish and sizing. Can you inform us of something that we could add to the water to restore the weight? With this inquiry I am sending two samples of the canvas, one shrunk and the other not shrunk.

Luster (2039).

The question of shrinking is a troublesome one at all times. It is a difficult problem to shrink any kind of cloth after it is finished and still retain the finish originally put on. In examining and testing the samples submitted it is evident that there is a considerable amount of sizing used to produce the feel on the sample that has not been shrunk. The sample that is shrunk shows that this sizing has been extracted

during the process of shrinking. The finish of the goods is another question altogether. From my own experience and from the experience of some of my acquaintances with whom I have talked, the same trouble is met with in nearly all classes of goods and on different qualities of cloth. The feel on the goods before shrinking is obtained by sizing the goods or starching them. It is evident that considerable gum and wheat starch is used. After shrinking the goods are soft and raggy to the feel, having no body at all, thus proving that the size or starch has been extracted. The finish on the goods is obtained by calendering with considerable moisture in the cloth, which helps to obtain the thick feel and also helps to set the finish. In one place where I had charge we had a lot of trouble with linings which had to be finished and shrunk as well. The goods were first finished to the pattern required, and during the shrinking process we had to pass the goods through water. In this water was mixed a small quantity of gum and wheat starch solution before immersing the goods. The quantity used varied according to the quality of the goods and the feel desired on the cloth. About 2 ounces of wheat starch and 4 ounces of gum was used to each gallon of water. This quantity was varied until the desired feel was obtained. After the shrinking process and the goods were thoroughly dried, another solution was prepared before finishing. This last solution is finely sprayed on the goods and acts as a conditioner or moistener for the cloth before passing through heated rollers to obtain the necessary finish. This spraying solution was varied to obtain different results on different classes and qualities of goods. In one solution was mixed 8 to 12 ounces of Epsom salts to the gallon, sometimes more and sometimes less as occasion required. Another mixture was 3 ounces of wheat starch, 9 ounces dextrine. Still another mixture was 2 ounces of rice starch, 4 ounces gum and 2 ounces of corn starch to each gallon of water. The starch must always be in solution. It is cooked or rendered soluble before being stirred in the measured quantity of water. It is a good plan to use the mixture of starch and water fairly hot as it is more penetrating when hot. Besides the above mentioned ingredients we use glucose, bone size, which is objectionable on account of the smell, common salt, isinglass and sizes made of resin, glue and wax, all for various finishes. I do not say these mixtures will solve the problem for "Luster" or rid him of the trouble, but we had success with using it on our linings and it will form a basis for experiment. If one mixture does not produce the exact finish he can experiment until he succeeds. The goods should be passed between rollers of some kind in order to reproduce the finish that was on the goods before shrinking.

Dulcimer.

PULLING WOOL FROM SHEEP SKIN SCRAPS

Editor Textile World Record:

What process and materials are used in removing wool from tanned sheep skin scraps, like sample shown at Fig. 1? Weymouth (2050).

We referred this question to our French correspondent who has had long practical experience as manager of a wool pulling establishment. He replies as follows:

FIG. 1.

I have never heard of any method of removing wool from tanned sheep skin scraps on a commercial scale. The tanning of sheep skin before removing the wool is a very special process. I would suggest that "Weymouth" try the following operations for pulling wool from these scraps:

1. Soak the scraps in water for three or four hours in order to soften the leather and open the pores.

2. Apply to the back of the skin a solu-

tion of sulphate of sodium with a small quantity of slacked lime added; or in place of this mixture use a solution of sulphate of arsenic.

3. Pull the wool from the skin by hand or by the machine described on page 384 of the June issue.

These solutions destroy the root of the hair and thus facilitate the pulling of the wool which, however, would be of little value. Gaul.

CORD-LAYING MACHINERY

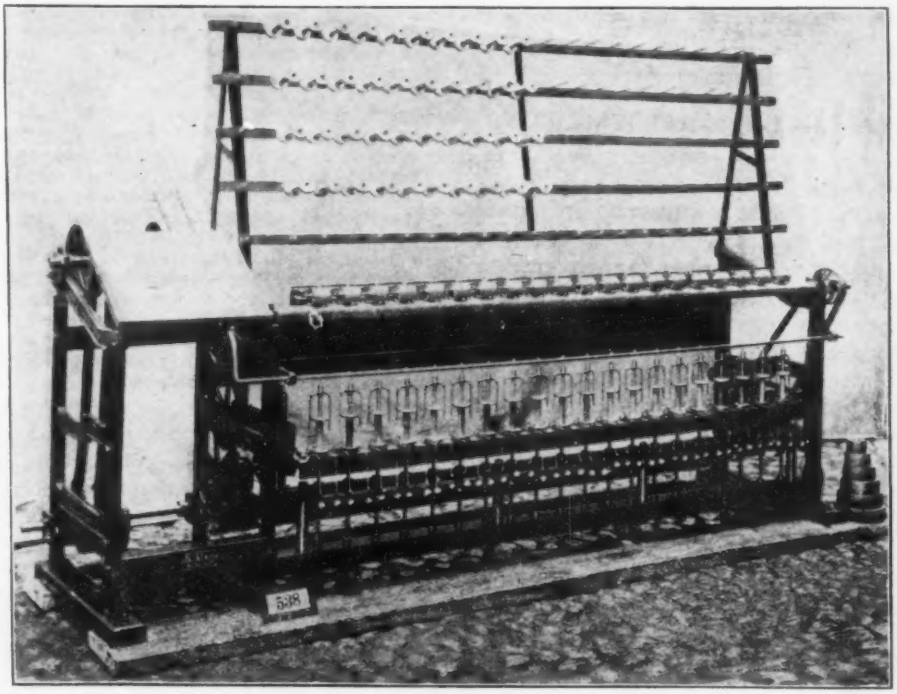
Editor Textile World Record:

I enclose samples of upholstery cords and would like to know the sort of machinery used in making these, also anything about the process.

Manufacturer (2005).

Our French correspondent to whom this question was referred replies as follows:

The upholstery cord like samples sent is twisted on flyer twisters, one of the best machines being built by G. Stein, Berlin, Germany. The single yarn is first twisted to the left into two-ply. A number of these two-ply threads (6 in the sample shown in the illustration) are twisted to the left, making a 12-ply. Two of these 12-ply cords are then doubled and twisted to the right, making the cord as shown. No special apparatus is required for the manufacture of this class of cord. Gaul.



THE TWISTER MACHINE FOR UPHOLSTERY CORD.

BLEACHING WITH PEROXIDE

Editor Textile World Record:

Referring to the answer of "Beta-Naphthol" to an inquiry on the bleaching of outing flannel in your July issue, we note that he recommends sulphur and especially bisulphide of soda for the bleaching of woolens, only bringing in the peroxides as an afterthought in the last sentence. We wish to correct the impression that peroxide bleaching is of secondary importance and has not been largely adopted by the wool bleaching trade. We are probably safe in saying that the majority of the woolens used for knitting and weaving purposes in this country are not peroxide bleached. The reason is

obvious. The public has become dissatisfied with the very ugly color developed by exposure of sulphur-bleached garments to the air, due to the re-oxidation in part of the coloring matters originally contained in the goods. Again the highly objectionable odor, resulting from the retained sulphurous acid in such goods, makes the wearing of them, especially near the skin, most unpleasant, the moisture from the body setting the gas free and making it strongly noticeable.

With the continual reduction in the price of the peroxides, which has been going on in past years, due to enlarged output of the factories, the difference in cost heretofore existing between sulphur and peroxide bleaching has been effaced, and the last objection to the adoption of the all round more satisfactory bleaching treatment with peroxide has been eliminated.

The Roessler & Hasslacher Chemical Co.

COST TABLE FOR MANUFACTURING SWEATERS

Editor Textile World Record:

Dear Sir: I note the question of "Grosser" (2048) and the reply in the August issue. The figures may be right for shaker goods, but not for a regular line. I give herewith a statement of cost as we calculate it, based on an average production of 150 doz. per week, using 5-gauge Grosser power machines, knitting bodies, trim, and pockets, and Grosser hand machines with a good knitter making full fashioned sleeves with cuff.

I take your estimate of 18 lbs. for a garment and allow 1/2 lb. for waste, which I find is an average:

18 lbs. 1/4 blood worsted at 85c.	$15.30
1/2 lb. waste	.48
Winding at 2c.	.37
Knit bodies, trim and pockets	.40
Knit sleeves fashioned	.75
All sewing machine operations	1.25
Mending examination, folding	.25
Boxes	.36
Buttons 1/2 gross	.63
Packing	.05
Shooks, 12 doz. cases	.10
	$19.94

An allowance of 10 per cent. of the selling cost is made to cover all overhead charges. We include as expense items thread, facing, labels, etc., but do not include trade discounts nor selling costs, which are figured on the price per dozen of each style. I do not see how these items could be made as an overhead charge, as the cost price and selling price vary so much. Unless a mill is running on one style only and selling to one house only I do not understand how it would be possible to average the selling cost and make it an arbitrary overhead charge.

Macbeth.

SCOURING YARN OILED WITH MINERAL OIL

Editor Textile World Record:

Under separate cover I am sending you a sample skein of shoddy yarn. We have had considerable trouble in scouring this yarn so as to remove the grease and oil used by the spinners. Please give us some information as to the best method of removing same. We are using the green olive oil soap and building same up with soda ash and carbonated potash. The soap stock is made up of 100 lbs. olive oil soap, 20 lbs. carbonated potash and 380 lbs. water. We have scoured 150 lbs. in the open tub by hand, keeping the bath at a temperature of 100° to 110° F., working the yarn eight times forward and backward in the tub, using about 30 to 35 lbs. of the above soap solution to each 100 lbs. of yarn. The spinners advise us that the oil they use is known as "standard wool oil." As we believe this is a mineral oil we want to know definitely what to do to remove it. We are sending under separate cover a sample of the oil used.

Sanford (2052).

Wool or shoddy stock oiled with mineral oil is extremely difficult to scour successfully for the reason that mineral oils are non-saponifiable and cannot be made soluble with any alkaline treatment.

In the treatment of his yarn, "Pontiac" uses a soap scour that is the superior of many scours used in mills that do not use shoddy or reworked wool of any kind, and where an easily emulsifiable oleine oil is used in the picker house.

In the present case I suggest an increase in the temperature of scouring to 120°, and that, if possible, he chain the hanks and scour in a yarn scouring machine, without changing the composition of the soap stock. It would be best if the spinners could be induced to oil the wool with another oil instead of the one they now use. Olive oil, or

an oleine oil, both of which are quite easily removed from wool by ordinary scouring, should always have the preference, as the wool is left in a much better and clearer condition than when it has been lubricated with mineral oils, the incomplete removal of which is generally detrimental to the yarn.

L. J. M.

I would not attempt to answer this question from the standpoint of the chemicals and fat oils, but I do feel like taking issue with the sweeping statement that it is necessary to drop all mineral oils. From my standpoint such a restriction should not apply to the Breton oils which, if handled in the proper manner, do come out of the goods just as freely as pure fat oils. I was told last week that on two recent lots of wool stock they actually emulsified it without the addition of any fat. The trouble is, most petroleum manufacturers do not know how to treat the wool stock so that this result can be obtained. We feel we are justified in making the statement, as hard as it may seem to the average man to believe it, that Breton oil, except in some exceptional cases and methods of handling, which are very rare in mill practice today, can be taken out of the goods as well as pure olive, red or lard oil. Sometimes we have complaints against our oil, especially on shoddy and in every instance we have proved that the oil that does not come out has been some other wool oil that has been put on by the shoddy manufacturer before it gets to the wool manufacturer.

F. W. Bradley, Agt.
Borne, Scrymser Co.

EQUIPPING A SMALL HOSIERY MILL

Editor Textile World Record:

I intend to start a small hosiery mill in Arkansas and would like some information on the following points: Could a small mill composed of five or six footers with the extra machinery to complete a sock be made to pay? We intend buying the yarn. Could the yarn be bought so as to do away with the dyeing after the sock is complete? How many ribbers would be needed for six footers and what other machines would be needed to make the sock complete? Can more than one size be knit on the same machine, making no difference in the number of needles? How much help would be needed to operate the machines for this size plant? How much would it cost to install a plant this size, figuring the building, steam power and machinery?

Weber (2062).

Unless "Weber" has the capital or some means of selling his product direct to the wearer, or else get a good price from the retailer, which I doubt very much can be done, I do not think it would pay to run a plant of the size proposed. Goods like sample are sold by the large manufacturers as low as 70 cents per dozen, which leaves only a few cents' profit on the dozen.

It would not be practical to buy the yarn in colors. Expert operators are required to do the looping and topping and it is almost impossible to see the stitches on the dark colors. Of coure it is not an impossibility, as it is done, but only in rare instances and then only for very high priced goods.

One ribber and looper would be sufficient for six footers, as an experienced operator can loop from 25 to 30 dozen per day. The production of the footers would be about 5 dozen each per day of 10 hours, providing "Weber" has experienced operators to run them. All sizes are knit on the same machine, the difference being in the length. All the information as to sizes and gauges of yarn, etc., can be obtained from the builders of the machinery. I am not conversant with the labor conditions in that part of the country. If it is a locality where experienced help can be had there would be needed only two knitters and one looper and probably another hand for inspecting, mending and any odd jobs that may have to be done. This of course does not include the dyeing. The superintendent of the plant should be conversant enough with dyeing of this grade of goods to oversee it with the aid of one helper who could do some other work when not dyeing. I would not consider it prudent to undertake the dyeing in such a small plant as it would certainly not pay. One could only guess at the cost of the building, the cost of material being governed by local conditions. "Weber" must figure out that part after securing information, or get into communication with a contractor, giving him size and kind of plant required. As to the machinery, the footers cost $140.00 each,

one latest improved ribber about $200.00 and a looper $75.00, and not over $50.00 for shafting and belting. As to steam plant, this information can be obtained from builders of steam power engines. I would not advise steam power for such a small plant. I would use electric power if same is available. If not, then either gas or gasoline would be the cheapest and a 2 h. p, would be ample. Should "Weber" be obliged to do his own dyeing and finishing, steam would be required.

In conclusion I would advise strongly against starting such a small plant, as it is well nigh impossible to compete successfully with the manufacturers who operate large mills. Kentland.

The success of the Arkansas enterprise will depend largely on "Weber's" business ability and also on whether he has had practical experience in the business. A mill with only five or six knitters and with a man hired to take care of the machines would not be a paying proposition. If the owner was a practical man and would make fine, high grade goods, selling to the retail trade, there would be a comfortable living in the business. I judge the sample was made on a 3 3/4 inch, 176 needle machine from 1/14s single ring spun carded yarn. The ribbed top is made on a common ribber about 4 inches in diameter. The sample shows it to be one of the cheaper grades of goods of which there are any amount now being made and for which there is very little sale. Yarns can be bought in the black, but the shade is never as good as when dyed in the piece. Using dyed yarn is always attended with more trouble and worry in topping and transferring. Black is the worst of colors when topping and knitting, and I have known operators to refuse to top black work. Yarn dyed in the skein will cost more in finished goods than making up in grey and dyeing in the piece. Six footers is rather an odd number to start with, as a knitter usually figures one ribber to five knitters on half hose.

If an experienced looper could be secured, one looping machine would be sufficient, but in this case it is apparent that all the help would have to be taught. In that case two machines would be a necessity. A dyeing machine would be needed as well as forms on which half hose are dried to give them their shape. The sizes used are generally 9 1/2, 10, 10 1/2, 11 and 11 1/2. All these sizes can be knit on one machine, but it is better to make the 9 1/2 and 10 sizes on a smaller diameter. There are no books to my knowledge giving the proper size of yarns to use on machines having needles of certain numbers to the inch.

The yarn most generally used on 176 needles 3 3/4 inch diameter is 14s, which weighs 29.75 grains to 50 yards. All machines have adjustments whereby different counts of yarn can be used. The machine mentioned will run from 1/12s to 1/16s, which will give a half hose of from 1 3/8 to 1 pound. Half hose made from 1/14s will weigh from 1 1/8 to 1 1/4 pounds, according to the variation of the yarn. For six knitters or footers three operators would be necessary, one for tending ribbers and cutting tops and two loopers, one for each machine. The engineer could do the boarding and drying. If "Weber" wants the best finish, a hot plate press would also be necessary.

The cost of the plant would depend largely on the kind of machines installed. I would advise "Weber" to write to the different builders of machinery and get prices. One thousand square feet floor space would be sufficient for a plant of the size named.

Cipango.

REMOVING SIZE FROM DRESSER CYLINDERS

Editor Textile World Record:

We have been trying to remove the baked-on size, starch and glue that has accumulated on warp dresser steam cylinders. We have used hot water, damp cloths, vitriol and soft soap, but all to no purpose. Will you kindly tell us how to overcome this difficulty? Anisquam (258).

I have always found that the size can be easily removed by softening with boiling water when scraping. Once cleaned the trouble can be avoided by greasing the first cylinder the warp touches, with tallow the first thing in the morning. This should be done before the steam is turned on. If this is done regularly an accumulation of size can be removed by merely wiping with a wet cloth. Montell.

Knitting Department

THE KNIT GOODS SITUATION

Many manufacturers of spring weight underwear report that they have sold up a good share of their season's productions and are not making very earnest efforts to secure more business until the yarn price situation becomes more settled.

The government cotton report which was issued on August 2d had the effect of making the market firmer on yarns and higher quotations are being made from week to week. It is predicted in many quarters that some of those manufacturers who opened their spring lines at last season's prices will have some reason to regret their eagerness for orders. If they deliver the goods they have sold, it will be without profit, if not at an actual loss. The fact that several lines of men's balbriggans were sold at $1.65 to $1.67 1/2 is pointed out as one instance of where the manufacturers have made altogether too low a price.

Some makers frankly admit that they are not sold up, but they are not looking for orders, feeling that they will be in a position to take on some business later on at better prices. One important factor in determining prices on knit underwear in New York State is the new labor law, which goes into effect October 1st, reducing the working time of all factory employes to fifty-four hours a week This is sure to be felt in the price of the merchandise and may cause a delay in the delivery of spring lines.

Makers of fall lines are very busy, having received duplicate orders in large volume from the jobbing trade the past month. It has also developed that retailers have been very late in placing their orders and seem only now to have awakened to the fact that desirable lines are scarce. They are now buying freely and in almost every instance are asking for quick deliveries. This only tends further to complicate matters.

Many underwear manufacturers have advanced their prices on cotton lines during the month and buyers have higher prices, as well as late deliveries to reckon with on all additional orders.

The fact that impresses one as most important in the underwear market today is the tremendous increase in the call for combination suits. One may be greatly entertained reading the advertising matter describing the different kinds of seats and crotches that are made on the various lines of men's suits. It is plainly apparent that the day of the open crotch suit for men has passed and that only those with some sort of a closed crotch can be sold. It remains to be determined which of the designs that are being exploited will fit and please the greatest number of average shaped men.

It is possible to buy very good combed yarn suits on Cooper's spring needle machinery as low as $7.00 per dozen. These will be retailed at $1.00 per garment, and combed lisle lines are being offered at from $9.00 to $11.50, with high grade mercerized lines at $13.50 to $16.50. These three groups comprise the bulk of the business being done on men's suits. A large proportion of these suits are being taken with short sleeve and three-quarter length legs.

Some discussion has taken place as to the relative merits of the loose fitting short sleeve, as compared with that made with the cuff. While there may be some advantage in the loose sleeve being cooler, there is the liability of its becoming wadded up under the arm, which is not possible on a sleeve made with a cuff. As for the three-quarter length leg, there is no contention except in its favor. A well dressed man today does not want an ankle length garment which shows a bunch round his ankle, nor does he want knee length which leaves a bare space between the top of the sock and the knee, but a three-quarter length garment which just fits into the rib portion of the sock seems to meet with all the requirements.

Manufacturers of flat balbriggan shirts

and drawers are also feeling the demand and many orders are being placed for three-quarter length drawers. Buyers generally are looking with pleasure upon this call, as it indicates the possibility of getting along with a smaller stock and that the three-quarter length will to quite an extent take the place of ankle length, knee length, as well as stouts.

One of the interesting features of the women's suit business is the large volume of orders being placed on the so-called three piece suit. This is being made quite largely this season of a plain stitch cloth without side seams and the construction is such as to give the width necessary through the hips.

HOSIERY

Hosiery manufacturers, as a rule, state that the selling season for the spring of 1913 was most satisfactory in regard to volume of business done. Buyers have placed orders for the larger part of the season's requirements, apparently having in mind the dilemma that many found themselves in after buying so sparingly for 1912.

Prices during the greater part of the selling season were low, in fact, too low for comfort to many makers who looked for lower yarn prices, but which have failed as yet to materialize. Conditions, however, may change in time to allow them to get under cover before it becomes necessary to turn the machinery on to spring orders.

Advance prices are now being quoted, but to many it looks like a case of locking the door after the horse is stolen. Advances asked are slight, five to seven and a half cents per dozen, representing the average increase.

In going over the business booked, it is apparent that buyers are looking forward to 1913 as another white season, as orders have been placed for immense quantities of white hose in all grades. Black and light shades of tan have also sold well and it looks as if about 95 per cent. of the business has been placed on these three groups. As for colors, only a few of the evening shades have been ordered and in small quantities.

It is understood that quite a smattering of laces have been ordered out from Chemnitz in white, tan and black to sell at 50 cents and upward, but we cannot learn of any in the low priced laces made on this side. Gauze weights will have the call for another year, but many lines have been bought with slightly more body than the cobweb kinds that have proven so unsatisfactory to the wearer. On all lines, buyers are asking for four-inch welts. In fact, the trade are becoming more exacting every season and all the modern improvements are called for at every price. Lines must have high spliced heels and double soles and such items as linen splicing are eagerly seized upon as selling points for the buyers.

In half hose the colors most in demand are black, tan, navy and grey with a fair call for white, but in the last named, it is only the better grades that are being taken.

The so-called pure silk socks to retail at 25 cents have sold in good quantities despite the complaints made on account of their lack of durability, but it is noticed that the same buyers are placing orders quite liberally on plated silks. Mercerized cottons have also sold well, notwithstanding the large business being done on silks.

DIFFICULTIES IN KNITTING

BY MAJUBA

When a man takes a new job as boss knitter he generally spends the first day or so looking around the room. This is a good plan, especially for a man who has never moved around the country much. It gives him a chance to size up the help and figure on just what they are worth to the mill. He will generally find many chances for improvement, for no two men work alike. The old foreman may have been there many years, letting everything go along as easily as possible until he wore himself into a groove that he could not or would not get out of. This brings to mind a boss knitter who had one of the best jobs in the country. He would do nothing but look over the rolls, weigh and measure them. He had a second hand that had absolute charge of the

knitting end. Another man had charge of the winders, giving the girls the yarn and keeping their time. He knew nothing about what was going on except that he was getting good cloth and all the shaped goods were right in length and weight. The result was that the second hand would carry out needles by the thousands and sell them to a small mill almost across the street. The second hand also bought tools on the firms' account and sold them on the outside. The boss winder would send to the office pay rolls bearing the names of girls that never existed and add a few dollars to the time of

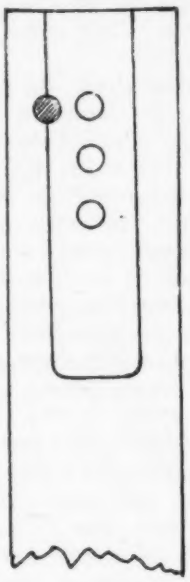


FIG. 1.

a few of the girls who did exist. After getting the pay envelopes at the office he would take out the extra money and change the figures, explaining to the girls that there was a mistake, but he had made it right. This state of affairs went on for over a year, but was finally discovered and there was a general clean up.

Getting good cloth is necessary, but that is not the only duty of a knitting foreman. A knitting frame to give good results should have a good cleaning at least three times a year. This affords a good opportunity to examine the dial, cylinder and cam ring. A frame that has run a year without being taken down and cleaned will have the slots of both dial and cylinder packed with lint. This makes bad cloth as some needles may work free on their furthest point in casting off the stitch, while other needles may have to be forced, thereby causing a dial needle to raise up a little or a cylinder needle to spring out a trifle. This all tends to make

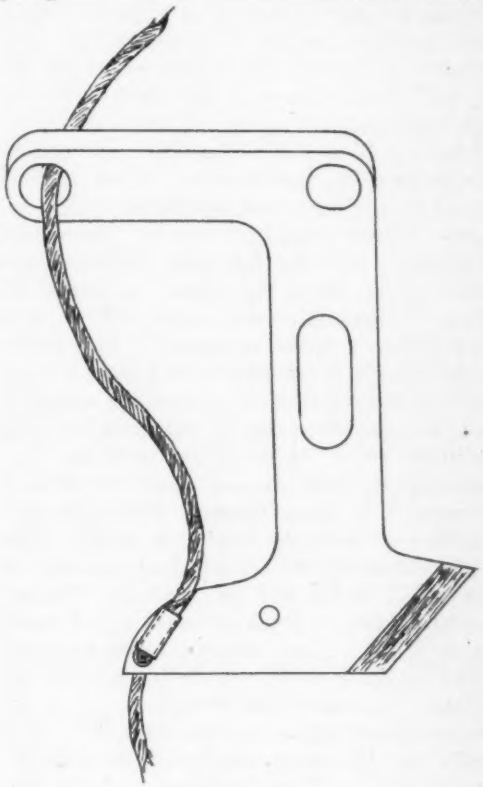


FIG. 2.

larger stitches on the tight needles and causes streaks or raised wales in the cloth. Sometimes the lint has to be driven out with a spreader and hammer if the frame has not been cleaned for some time.

When the frame is taken down the cams should be examined carefully and the broken or badly worn cams taken out. A good set of cams, well fitted in and running smoothly has a great deal to do with good work. The cam ring should be taken out and cleaned, for in many cases bits of broken needles get through the oil hole, lay on top of the running surface of the bed plate and cause the

frame to turn hard, or wear a rough face on the ring or plate. After setting the frame up and before putting the needles in place, the dial should be trued. If the dial is trued and the spindle is too small for the hole in the dial hub, the cloth will pull the dial down on one side, making a short stitch on one side and a long stitch on the opposite side. It is a bad practice to use more than one make of a needle at a time. If a change has to be made take out all the needles in all but one or two of the frames, saving them to run up the old stock.

Nearly every knitter has his own idea as to which is the best needles. Some of them place all their faith on one brand which another knitter would not touch. There is a difference, but that difference nearly always lies in the stock the needle is made of. Take for example two frames set up with two different makes of needles. One frame after running some time would show a loose rivet in the needles, or perhaps the needle is too soft and the point of the hook or latch becomes worn. With the spoon of the latch striking the hook several thousand times a minute, it is not surprising that there is a continuous wearing strain on them. The other frame might or might not show any of the above faults, but will probably disclose a poor quality of stock by breaking off short at the rivet. Some needles being too soft wear out easily and a few drops of oil in the cylinder will run black streaks for yards, as the needles bring to the top all the dirty, oily stock that has worn away from both needle and cylinder. There is a way to keep this black oil from touching the top, but this will be taken up at another time.

The winding of yarns from cops to bobbins is gradually being done away with. The yarn is bought on cones and run off directly to the knitting frame. This is a great saving, even at the small cost of cone winding. It saves the space that would be occupied by the winder and the saving of the winder waste is an important item. It saves handling and the wear and tear on the bobbins and winders. The cone user generally has a winder, but only for pieces of cones. A mill that started in 1897 has 77 body frames, 25 sleevers and one 24-end winder. A few years before there would have been an investment of about 10 or 12 winders and perhaps 2,000 bobbins. Just as good work can be got from the cone as from a bobbin. It is a good plan when using the stop motion and cones together to plug up the largest holes in the stop motion stripper that are not in use, so that the knitters will be compelled to use the right hole and a bunch can be taken out instead of making bad work. It is a bad practice for a fixer to use the cross arm hub set screws to change the position of the dial cap. There are two flat spots on the spindle and changing these flat spots away from the set screw points means trouble.

The dial cap set screws should be used for changing the cap. Down in the hoe cake belt of South Carolina a knitter had worked many days to true a dial, but when raising the dial to running position they would be all knocked out. The writer of this article, then a selling agent, tried his hand with the same result, but on the second trial I saw that the dial acted strangely, as it wobbled only when at a certain point. Taking the dial out we looked at the spindle and found that the edge between the flat spot and circle had been burred, Fig. 1. We found that the spindle was off the flat spot and touching the edge. On tightening the screws would go the way of least resistance. After filing the spindles true there was no more trouble. The cross arm set screws were put in the center of the flat spot and dial cap screws used to put in place. The frames then started off all right. In connection with these set screws I would say, always keep them tight, as the following incident will show. I was sitting in the office of a mill near Boston when a young man came in. He was, as I afterwards learned, a college boy learning the business. He told of some trouble he was having with a knitting frame. He said the frame was no good and that no one could run it. He went on telling or rather giving a confused account of what the frame was doing. The man to whom I was talking looked over at me and smiled. When this college "know it all' had gone he asked me

to look at the frame. When we got there the boy stood in front of it. I took one look and said there was nothing the matter with the frame. He looked at me in amazement. When I told him I could fix that frame in a minute he wanted to bet me five dollars I couldn't. I started the frame and while running loosened the dial cap nuts enough to let the dial run ahead to where it belonged, as in this style of machine only the cloth, dial and cylinder turned round. I found he had jerked the frame backwards several times and that the set screws were loose enough to let it go back but not to return. That was the cause of the trouble.

A good thing to have in a knitting room is a bell which rings every half hour. That bell is a signal for every knitter to stop and look at the cloth. This system is in operation in several mills. A piece of bad work that had run over half an hour can be traced to the knitter, and it is often a case of the knitter looking for another job. This bell is worked in various ways. One is connected with a winder cam gear slowed down by other gears. One gear has a pin through it and a wire runs up through the board top to a spring gong on a post. It takes this slow gear almost half an hour to get around and pull the bell. Another scheme was to have an emery wheel stand run from a slow shaft to a set of gears on the stand, and at a certain point make a connection with an electric buzzer. Still another scheme is to have a clock with an electric bell that rings every twenty minutes. A man need not have a grouch or be a crank to get good results from the help. All help are not alike, some take pride in their work, the pay envelope not being all they look forward to. A little advice in a quiet way or a kind word will do more towards getting better work than all the growls and curses of the old time bosses.

Systems come and systems go, but the system that checks a needle bill ought not to go. No knitter when he lets a needle drop to the floor thinks that means a penny. There are many systems to check the waste of needles, and a good one is to make the knitters bring back old needles and exchange for new ones. That means there will be no loss and every needle used. The plan to make a record of each knitter's needles is only to show who uses the most. It does not show the needles swept up or thrown out of the window. The system of making the knitters pay for their needles has gone out of practice. It causes too much trouble. One mill in town might adopt the system, while the other mill would have their needle bill greatly increased, as one set of knitters would steal needles for the other set and divide profits.

On two thread plated work, such as worsted and cotton, we had a lot of trouble caused by the inside thread jumping out, or rather it would catch or snap quickly, form a loop and catch in the dial needles, running behind the guide as the frame turned. The thread would run around the needle butts, filling the cam full of waste. To overcome this difficulty on fine yarn I had a small sleeve made and soldered to the guide, as shown at Fig. 2. I used brass sleeves and they did good work until the thread wore and cut them away. I then had sleeves made of steel and they do the work well. There are no more ends out and no more "run unders," all the result of this simple device. We do not have to knit two rolls of silk and wool to get what we should have had in one.

CLEANING LATCH NEEDLE MACHINES

BY DENBIGH

In knitting cloth for underwear on latch needle knitting machines, especially on 11 or 12 cut, it is necessary to have the machines adjusted very close and all stitch and dial cams drawing alike in order to produce smooth and even goods and keep all lines out of the work. Most of these lines are caused by dirt getting into the needle slots and pushing the needles out of position, causing them to take more yarn than they should. These lines give a very uneven look to the cloth. Dirt will also make some of your needles tight in their slots. As a result the needles will not come back into their proper position after the stitch cam has drawn the stitch. This defect also causes a very uneven looking piece of cloth. In

cleaning a cylinder and dial I would suggest using a flat piece of steel a trifle thinner than the slot and ground to a sharp point at one end. This is run in through the slot, removing all dirt and gum. After going through the cylinder and dial with this tool I put a fine, flat file of the same gauge as the needle into a clamp handle, which would protect the file and keep it from breaking. This file is run through each slot, smoothing the rough edge. After going through each slot carefully with this file I go over the stitch cams with a pair of micrometer calipers, getting them set so that they all draw alike on both cylinder and dial. The machine is then put together, care being taken to have no dirt under the cylinder where it screws to the cylinder ring. I then put the needles in the machine, looking them over carefully to see there are no bent ones or bad latches. The guides are then examined carefully. I next pick a piece of cloth into the needles as lightly as possible, working it over carefully to see that all latches are open. The machine is then ready to start. The machine will turn out good work. There are several different ways of evening the stitch, but none quite so accurate as evening the stitch cams with micrometer calipers. If the machine makes holes that cannot be laid to bad needles or a yarn carrier I would then look at the take-up and see if that also is clean. Not enough attention is paid to this part of the machine. A dirty take-up will cause slipping and cause the cloth to creep, pulling the stitch so tight on some needles that it will break holes, while others will not cast off clear. After cleaning the machine I advise flooding the needles twice a day with some kind of white oil. This will keep the slots clean and spoil only about one-half yard of cloth at each flooding. The oil will wash all dirt out, and keep the needles working free. I have been cleaning my machine this way for many years and have had the very best results. I would advise any knitter to follow this method if he wants to get good cloth and lots of it with very little waste.

PIECE WORK ON RIBBED UNDERWEAR KNITTING

BY TRENTON

A few years ago I stopped in a city in Central New York and obtained a job as second hand in a knitting room. The mill was not over a year old and the frames were new. The superintendent wanted to introduce a piece work system so as to get full production from the frames, and he certainly did need something of the kind. One set of 12-inch frames would take off 30 to 40 lbs. more cloth in one day of ten hours than the next set of 12-inch machines running under same conditions. The fault was with the knitters. One knitter, for example, would start the day by coming in late, getting all the frames going five minutes after his arrival. Ordinarily he would not oil or clean them; if he did, it would be a poor job. When a frame stopped for yarn it was stopped until he went to the winders. Naturally he would stop to talk with the girls on the winders. While he was gone, more of the frames stopped. If he happened to get them all going at once, he would spend his time hanging out of a window. This kind of a knitter is generally the one who uses more needles, and makes more waste than a dozen of the busy kind. He looks at the clock too often. On the other hand there are knitters who are never idle, the kind that have yarn ready to put up at once. They use the oil can and cleaning rag every day, do not leave their frames, but watch them closely, and best of all they never have over one or two frames stopped at the same time. Such a knitter does not walk up to the clock every 20 minutes, and he does not lengthen the needle bill. Such is the difference in knitters, and both draw the same pay.

Some kind of a system was sorely needed to get the work out of the poor knitters, and the only tender spot they had was the pay envelope. For a start each roll of cloth was weighed and the knitter given credit. No one except the boss knew the reason for this, and in fact no one inquired as the frames were numbered and the cloth charged to a

number. The record was kept for several months on heavy weights, and was continued for some time after going on light weights. A fair average was calculated for a set of frames and piece work prices were fixed for the various weights of goods. To even up the difference between a large and a small size, say a set of 9 inch, a frame was added, making a set of seven 9-inch frames to six of the 17 or 18-inch machines. When all was ready a notice was posted giving the prices paid for all kinds of cloth, and a day set when the piece work system was to start. All bad work over a certain amount was to be paid for. Special notice was taken of what was said regarding the system, also who said it. Many of the knitters of the better class seemed to be pleased, and there were a few growls. The kickers were just the ones expected to make the kick. I have in mind now one young fellow who found the most fault. He had been moved from a corner where he could not be seen very well on account of cloth piled on a table, and put on a set near the desk. He always had trouble. He would leave his frames to talk to the cutters, and generally misuse his machines. It was a surprise to see him have them all going.

The first day on piece work came around and started off in good shape. The frames started on time, and there certainly was a lot of ambition around that room. It did not take 20 minutes to get a drink, and stranger still, they could get yarn from the winders and get back the same day. There were no more continued stories told in the alleys, and knitters doing the drum major act with a stop-motion stick were no longer seen. There was plenty of activity shown by even the slowest of them. There was a rule in effect at that time allowing five minutes to get ready to go home. Most of them had been in the habit of standing with their hands on the shifters, waiting for the five minute bell. Under the old system there was no one in sight a minute after the bell rang. Even the knitter farthest from the coat room had managed to disappear. Under the piece work system that five minute bell suddenly lost its charm. They beat the bell by driving nails in the window frames for their hat and coat, and they were there at the last turn of the shaft. There was no more crowding on those crooked stairs, and the watchman often locked the doors after a crowd of knitters, instead of the old ladies in the mending alley.

Before the piece work system was started it was customary to stand outside and talk, or take the last pull on a pipe or cigar, as the whistle blew. The new order of things found the boys with their hands on the shifter ready to start. The belts were kept clean. Plenty of belt dressing was used, and an eye was kept on the tally sheet to know what others were doing. If a frame got out of order the knitter on that set did a hot foot after the fixer, and kept after him until the frame was started. The old way was for the knitter to take his time to find the fixer, and he usually traveled all over the mill before finding him. It made no difference if the frame ran or not. Now the poor fixer's job suddenly became a burden, for any frame, no matter what the cause, would stand in preference to having bad work charged against it. Frames that had formerly broken needles by the handful ran so well they became a subject of general comment, as each knitter was after the "needles used" record.

The difference in the cloth became remarkable, the pile of waste pieces on the cutter's table disappeared into gussets, and good cloth had to be used for that purpose. The percentage of seconds made a drop to where it belonged and stayed there. There was no more rough handling of the frames, for that sometimes led to trouble and stopped the machine, and there was no money in a standing frame. The production went up in jumps where it was expected to go, and many times went beyond the figure the firm expected. This was explained in many ways. Some knitters carried their lunch and worked the noon hour. Others gained a few hours during the week, and frames did not stand. Many times a knitter would fix up a frame himself on an easy job, instead of letting it wait for the fixer. The new system was a success in every respect.

The knitters made more money, the firm got more cloth, and the expense of knitting, including needles, waste, lost time and repairs was less. The help were more industrious and steady. They seemed to take more interest in life. The lazy, shiftless and tired operatives braced up, and at odd moments helped the others. All discontent was forgotten. Instead of training new help, the old hands, who had quit for various reasons, wanted to come back again. Only twice in the last year I was with this concern was bad work charged to the knitter.

MILL EXPERIENCES

Under this head we will publish from time to time stories from practical mill men, telling of vexatious and unusual difficulties which have occurred in different branches of mill work, and how they have overcome them. We invite mill men to send us an account of such experiences. We pay, of course, for all that we use. Facts told just as you would tell the story to a friend are what we want, not fancy writing.

STARTING A KNITTING MILL

BY F. W. HERINGTON

(Continued from August.)

The mill village was twenty-six miles from the railroad. Material and supplies were carted in by teams, the team going out with goods one day, and returning with wool and supplies the next day. Passengers were taken by stage-coach, the drive occupying practically the entire day. The coach left at 10.30 a. m., stopped at another village about half way out for passengers and driver to get lunch and horses to be fed, arriving at the railroad station about 5.30 p. m. There was a branch railroad of about 50 miles in length being constructed at that time, but it was not completed until about 1880. In 1879 the Marquis of Lorne, who had been appointed Governor General of Canada, visited a town about 30 miles from the mill village. He was accompanied by his wife, the Princess Louise, who was a daughter of Queen Victoria. This being such a notable event, the mill was shut down for the day. I got together a party of ten, hired a team and carryall, and we drove ten miles to the station on the new railroad. Leaving the team there we went by train to the town where the royal visitors were, returning by the same route at night.

My first experience on knitting by machinery was obtained from a small stocking machine, operated by hand, which the owner of the mill had procured a short time previous to my going to the mill. At the present time it would be considered a very crude machine. At that time it was thought to be a wonderful machine, it being about one of the first machines of its kind. A pair of long stockings could be knit on it in less than an hour, compared with the time it took the farmers' wives to knit the same stocking by hand, the machine marked a long step in advance. The owner of the mill had purchased the machine with the idea of making improvements on it, and so I had to learn to operate it with this in view. We worked on the machine, changing, altering and improving its mechanism for two years, until we had our knowledge and practical ideas complete and were ready to build a new machine. The original machine had a single cylinder, making plain work only. We added a dial, which was the part of the machine we obtained patents for in Canada, United States, England and Germany. The dial was cone shaped, and, so far as I know, is the only cone shaped dial ever made for a knitting machine, all other dials since then having been flat, using a different and a shorter length needle than on the cylinder. The dial was set directly over the cylinder and was made cone shaped for the purpose of using the same length of needle in the dial as on the cylinder. With this machine a man's sock could be produced complete, including the finished welt at the beginning, then 1 and 1 rib top, the plain stitch for the leg, the old fashioned square heel, as made by hand, the plain stitch for the foot, and the round toe, closed by hand after coming from the machine.

The dial was cut for 1 and 1 rib. Every other needle in the cylinder was taken out. Two courses of a hard cotton thread was knit, to separate one sock from the other. Then the yarn for the 1 and 1 rib top was tied on. By means of a switch cam the dial needles, with the stitches on, were drawn up

from the cylinder and held, while two or three courses were made on the cylinder needles only. Then the dial needles were thrown into action, which produced a perfect welt. The cotton thread put in at the start was cut and drawn out, leaving the welt top at the beginning of the 1 and 1 rib for the upper part of the sock. After a sufficient length of 1 and 1 rib was knitted, the needles in the dial were transferred with their stitches on them, one by one back into the cylinder. The cone dial being empty of needles, was lifted from the cylinder, then came plain knitting for the required length of the leg, and then the square heel was made. Half of the needles in the cylinder were raised out of action, then on the other half was knitted a flat web by knitting back and forth on these needles for the required length of the heel. This left a selvage edge on each side of this part. The number of needles in this half of the cylinder were divided into three parts. One-third on each side was taken out of the cylinder with the stitches on, and left hanging inside the cylinder, leaving the center third in the machine. These were knit on back and forth, and at each single course on each side, one of the stitches from the needles was taken out and left hanging inside. The cylinder was transferred to the end needle on each side, continuing in this manner until all of the stitches from these needles were transferred, thus completing the square heel. The other needles were next put back into the cylinder, and the stitches of the selvage edge on each side placed upon them. The other half of the needles which were raised out of action at the beginning of the heel were then pushed down, and the plain knitting for the foot made. In this manner the selvage sides of the square heel were joined to the foot. When the required length was knit for the foot the toe was knit just as the round heel on half hose is now made.

As the round heel could be made more quickly on these circular machines, it was the one finally adopted and is now being made on all circular hosiery machines, the square heel being made only on flat knitting machines, where the selvage edge is at the back of the stocking, down to the bottom of the heel. The square heel on circular machines is something which a good many hosiery manufacturers of today have never heard of.

Fig. 4 is a square heel showing the selvage edge.

Fig. 2 is a round heel showing the connection to the leg and foot.

Fig. 3 is the square heel showing how the selvage edge of the heel is connected with foot.

By constant practice I was able to knit a

FIG. 1.

man's pair of socks in fifteen minutes, which was considered wonderful at that time. The machine was obtained and taken to New Brunswick, where it was exhibited, and the patent rights for the Maritime Provinces only were sold for $5,000. In 1880 I took the machine to Toronto, where for about four months I demonstrated its working. A stock company was being formed for the purchase of all the other patent rights, which were sold for $30,000. The newly formed company afterwards manufactured and operated the machines for several years. They also sold the English patents for $50,000.

This ended my connection with the machine. It was later superseded by the 3/4 automatic hosiery circular machine, and today is not known.

A short time previous to my exhibiting the machine the owner of the mill made arrangements to remove the plant to another small village, which was only three miles from the railroad station. There was a small pond there about an acre in area, which was supplied from several natural springs, about a mile above the pond. This gave a water supply for power for a small mill, but no more. If the summer weather was exceptionally dry the power was greatly reduced.

A new mill having two stories and basement was built, and a small iron turbine wheel, about twenty inches in diameter was used. The mill was built on the lower ground, outside the dam, so that the water in the pond was about level with the second story of the building. The wheel was contained in a box flume, L shaped, with the wheel in the bottom. This box flume was about twenty-four feet in height, and about thirty inches square, so that we had what was called a twenty-foot fall, as the water entered the flume by means of wooden pipes about two feet in diameter, running from the pond into the top part of the box flume, the water discharging from the bottom of the wheel into a small tail race or creek.

I returned to this mill at the time the machinery was being moved and set in place. As already stated, the owner of the mill was interested in a gold mine, about thirty miles from the old mill. The only thing I had to do with the gold mine was to pay the miners' wages. Frequently another young man and I used to start on Sunday afternoon and drive twenty-five miles to the nearest bank, go to the bank as soon as it opened on Monday morning, obtain the money and drive to the mine with it. As the bank was twenty-five miles from the mill in the opposite direction and the mine was thirty miles from the mill, this made fifty-five miles we had to drive on Monday. We usually reached the mine between eight and nine o'clock at night, returning to the mill the next day. The owner of the mill was putting all of his money into this gold mine, including the profits from the mill, until he had invested about $40,000, which he eventually lost. This crippled him financially for the mill business, so that he failed in 1883 or 1884. The quartz was there and the gold was in the quartz, averaging about $40 to the ton, but the crude methods for getting out the rock and extracting the gold were so expensive that there was no profit in the operation. It was very hard in those days to get capital interested in a venture of this kind in

FIG. 2.

Canada, because there were not very many men who had large sums to invest. A few years later some American capitalists formed a stock company of $500,000, purchased the best machinery for handling gold quartz and made lots of money out of the mine.

I remained at the new mill for two years and I left of my own accord in 1882, after being in this owner's employ for over ten years. As I knew he was not in a position financially to increase his mill business, I began to feel that it was about time I made a change, and get into a larger mill, where I could increase my knowledge in knitting, and get a wider practical experience. I have stated that during the time the mill was be-

ing built I was in Toronto exhibiting the hand hosiery machine. The building of the mill was left in charge of an old mill wheelwright of about twenty years' experience, who was supposed to be thoroughly familiar with water wheels, water flumes, dams, water pipes, waste weirs, tail races, steam boilers, engines, steam pipes, and other machinery required in different mills. Everything was expected to be all right. The mill was heated by steam by means of coils of pipe fifteen or sixteen feet long, with return elbows. About four sets of these coils were on each floor against the walls, the drip be-

FIG. 3.

ing run through the wall of the building outside. This was the usual method of dripping steam pipes then, so that when steam was turned on the plan was to open the valves, and let the steam drive all the water out of the pipes. When the pipes were clear of water the drip valve was closed so that the water dripped as fast as the steam condensed in the pipes. This method was all right, provided the coils were set up so that they would drip by gravity without the steam having to force out the water. Otherwise, when the steam was allowed to go down, the water would freeze in the pipe outside. The outlet for the water being thus stopped up, it was only a short time before all the coil would be full of water from the condensation of the steam. The old millwright had set up and connected these steam coils in such a way that they would not drip of their own accord, unless steam was used to drive out the water. As the winter came on, I told the owner that it would be necessary to hire a man to keep up steam all night, otherwise the pipes would become frozen and burst. All went along nicely until one extremely cold night in February, when the thermometer was ranging from fifteen to eighteen degrees below zero. The man went into the dry room at midnight to eat his lunch. As this was a nice warm spot for a very cold night, he fell asleep, and when he awoke two hours later the steam in the boiler had gone down and every coil gradually filled up with water and froze, so that all the pipes and valves burst. This resulted in the mill being shut down for nearly a week, as all new pipes and valves had to be obtained from the city. I took charge in the setting up and placing of the new pipes, and arranged them all in such a way that they all dripped by gravity from both floors to the basement and into the large iron kettle used for making soap. At night all that was necessary was to leave one valve open, when all the pipes would drain.

(To be continued.)

AN IMPROVEMENT IN FULL FASHIONED KNITTING MACHINES

This machine, lately patented in the United States, is designed to produce a full fashioned stocking blank comprising leg, foot and heel-caps with transfer, ready for looping to make the full fashioned stocking. The inventor describes the machine as follows: After the stocking blank, being knit from top to toe is completed, up to the beginning of the heel caps, the auxiliary presser-bar is operated to secure pressing of only the end needles of the series to knit the heel caps. The selvages are subsequently attached by a looping operation to the first loops of the courses for the foot. The middle or instep portion of the blank is not affected by the operation of the auxiliary presser-bar, but during the knitting of the heel caps, the regular presser-bar is prevented from operating upon the needles for

forming the instep, by affecting the motion of the needle-bar toward the regular presser so as to prevent the needles from coming in contact with it.

Knitting a stocking blank in this way effects a marked saving in time and labor; prevents unequal proportions of the knit parts of the blank, and results in a saving of waste and a more uniform knitting of the

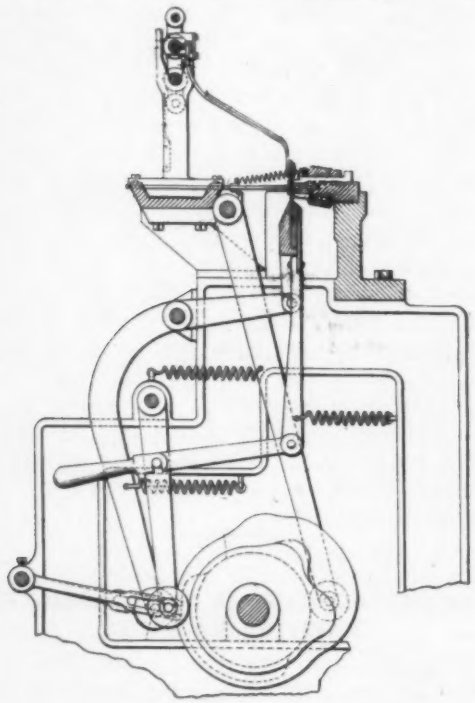


FIG. 1.

leg, foot and heel. Upon removing the blank from the machine, the only operations necessary to complete the stocking are the looping together of the seams at the side of the heel, and then looping up of the back, sole and toe-seam.

Fig. 1 is a sectional view of a machine equipped with the improved device. Fig. 2 is a prospective view of a portion of a stocking blank showing the leg and heel caps. Fig. 3 is a plan of a portion of a completed stocking showing leg, foot and heel caps ready to be looped. During the knitting of the fashioned leg blank ordinary knitting is continued until the heel-caps are to be formed, when, instead of casting off loops between the heel-caps, the loops are retained on the needles in action during the period of formation of the entire heel-caps and when completed the last loops formed of the heel-caps are cast off and the middle section

FIG. 2.

loops still remaining on the needles are brought into such action as to continue uninterruptedly the formation of the stocking blank. Upon removing the blank from the

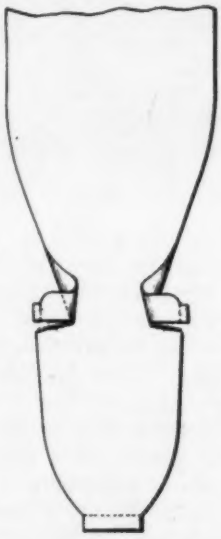


FIG. 3.

machine, the only operations necessary to complete the stocking are first, the looping together of the seams at the side of the heel; and second, the looping up of the back, sole and toe seam.

Dyeing, Bleaching, Finishing, Etc.

BLEACHING WITH PEROXIDE OF SODIUM

BY J. MERRITT MATTHEWS

Though sodium peroxide has been a substance which has long been known to chemists, it was not until the development of the electric furnace made possible its cheap production that it became a commercial product. Sodium peroxide is now sold at a price which makes it available for use by the bleacher of fine goods, especially fabrics of silk, wool or mixed materials. As yet it cannot compete with chloride of lime or other forms of chlorine bleaching agents for the bleaching of the cheaper grades of cotton and linen goods. For fine cotton materials, however, where it is desired to produce a fabric of soft feel and to preserve to the fullest extent the quality of the fiber, sodium peroxide may be employed in place of the chlorine bleaching agents, as under such conditions a somewhat increased cost of the bleaching is fully offset by the increased value of the fabric.

The oxidation brought about by the use of sodium peroxide appears to be somewhat different in its action on the fiber of cotton or linen than that of chloride of lime. The oxidizing action of sodium peroxide is really due to the formation of hydrogen peroxide in the solution in which the sodium peroxide is dissolved; and this in turn oxidizes or bleaches through the liberation of ozone. In the case of bleaching powder, its action is due to the presence or formation of hypochlorous acid. This is a compound which readily suffers dissociation with liberation of oxygen. In general the oxidizing action of bleaching powder is more severe and rapid than that of sodium peroxide. This is evidenced by the fact that in bleaching with the former it is only necessary to have the cotton fabric in contact with the bleaching liquor for a compartively short period of time in order to have the fiber thoroughly bleached. Under ordinary conditions and when employing dilute solutions of the bleaching powder, one hour is generally sufficient to yield the full degree of bleaching. If the treatment is continued for a longer period of time than this there is grave danger of the fiber being injured by the severe chemical action of the bleaching agent. The result will be that the cellulose of the fiber will be broken down through the formation of oxidation products, known as oxycellulose. This leads to a rapid disintegration of the physical structure of the fiber and results in tendering it.

Where sodium peroxide is employed as the bleaching agent, the fabric must be left in contact with the bleaching liquor for a comparatively long period of time, usually from ten to twelve hours. This shows that the oxidizing action is slow and mild. The result is that there is very little danger of overbleaching and the consequent oxidation of the cellulose or formation of oxycellulose. There is little or no fear of the material becoming tendered when bleaching with sodium peroxide. The bleaching action of sodium peroxide may be likened to the bleaching action of combined sunlight and air. This, as everyone knows, is the mildest and yet at the same time perhaps the most thorough form of bleaching either cotton or linen goods. The bleaching effect in this case is brought about by the formation of ozone in intimate contact with the fiber. Although only minute quantities of ozone are actually formed, its action is gradual and cumulative, and results in the thorough bleaching of the fabric without any deleterious action. This method of bleaching is, however, generally prohibited by the great length of time it requires and also the great space necessary to carry out the method. Recourse must be had, therefore, to some other method which is more economical. Linen goods are always seriously weakened by a complete bleaching with chloride of lime solutions, but if bleached slowly by the grassing process or atmospheric method a

good full white may be obtained without any appreciable deterioration of the strength of the fiber. This, however, takes a long time and a large amount of labor must be spent on the process in handling the goods. By employing sodium peroxide for the bleaching of such fabrics the conditions of the grassing method may be somewhat approximated, especially if weak solutions are used in several successive treatments. The strength of the fiber may thus be admirably preserved and at the same time a good clear white color may be obtained.

There is one point in the matter of bleaching either cotton or linen materials which is often overlooked; this is that proper bleaching by whatever means should always be accompanied by a previous thorough cleansing of the fiber from non-cellulose materials. This is generally accomplished by what is known as the boiling-out process. Cotton in its natural state is associated with substances other than the pure cellulose of the fiber proper. These consist of waxy and resinous matters which are usually classified under the general name of "pectin" matters. If these are not removed from the fiber previous to bleaching a much larger amount of the bleaching agent will be required, and the bleaching action, especially in the case where chloride of lime is employed, will have to be conducted with much greater severity in order to produce a good clear white color; hence there is greater danger of injury to the structure of the fiber itself.

Where sodium peroxide is employed for the bleaching agent and the cotton has not received a thorough boiling-out before being subjected to the action of the bleaching liquor, the result will nearly always be defective. In the first place a much larger amount of peroxide will be used up in the process, bringing the cost of the method often to an absurdly high figure; and in the second place, the color will not be a good white, but will retain a creamy or brownish appearance. The chief defect, however, is that the bleaching is more or less superficial, and though the goods may present quite a satisfactory appearance as far as color goes when newly bleached, after standing for some time or when opened up after being packed for a few weeks, the fiber will have returned almost to its original unbleached color. This is especially true in the case of underwear fabrics, when the garments are washed. I have seen such fabrics when newly bleached exhibit a very nice appearance, but when washed for the first time they returned to a condition which would be considered almost as an unbleached state.

This defect is caused by the fact that the impurities have not been removed before the bleaching, and that consequently the sodium peroxide in its whitening action simply operated on the surface of the fiber. In other words, the bleached fabric was only white on the surface, while in the interior the original coloring matters and impurities still existed. After a time these impurities will work out to the surface and the fiber will lose its white color. This action is much enhanced by washing the fabric, as in this case the water penetrates the fiber and partially dissolves the pectin matters, bringing them rapidly to the surface.

Good bleaching is really not so much a matter of making the fiber white as it is of removing all the impurities so as to leave nothing but chemically pure cellulose. If this object is attained, the fiber will not be injured and the white that is obtained in the bleaching will be permanent. Many bleachers have the idea that the bleaching effect is obtained solely by the use of the bleaching agent, such as the sodium peroxide, and that the only preliminary treatment that is necessary is to cleanse the fibers of the extraneous foreign matters which may be present, such as dirt and grease. To obtain a good, thorough and permanent bleach with sodium peroxide it is necessory to give the cotton a complete boiling out with alkali as for the purpose of obtaining a thorough bleaching in the case of cotton piece goods. This cannot be accomplished by simply running the fabrics in a hot soap solution, or even by using this solution at a boiling temperature. This simply cleans the surface of the fiber, but does not remove the pectin matters held within. To get at these the goods should be boiled-out in a closed kier with a solution of caustic soda.

The objection generally made to the more

severe method of boiling-out previous to bleaching is that the process makes the fiber harsh and reduces its natural resiliency. This is due to the fact that much of the softness and pliability of the cotton fiber is due to the presence of waxy matters. When these are removed it is natural to expect that the fiber will lose somewhat of these qualities. They may be partially restored after bleaching by the judicious use of proper softening agents. It is not possible, however, to produce a result equal to the raw fiber. The bleacher of cotton knit goods must decide whether to produce a thorough and permanent bleach and lose somewhat the natural "handle" of the cotton fiber, or retain the natural softness and resiliency of the fiber at the expense of the bleach. As far as wear and durability and real intrinsic quality is concerned it is better to adopt the latter course. If appearance and whiteness is the main object to be gained, then it will be necessary to adopt a method of treatment which has for its purpose the complete removal of the waxy and pectin matters before the bleaching proper.

TESTING FOR FASTNESS TO LIGHT

By Dr. Van Klemperer in the Berlin Farber Zeitung

The writer has already recommended the use of the Kallab color analyzer for determining the changes undergone by dyeings under the action of light. By no means the smallest reason for selecting this analyzer is that the numbers by which Kallab designates the shades give an idea of the color even when the apparatus is not at hand, and because a graph could be made to show clearly any color changes.

The writer then began researches, in conjunction with Dr. Lowe, of Jena, with the object of trying whether it was not possible to compare two shades at once, by means of the same eyepiece, and therefore under identical conditions. This cannot be done with the Kallab colorimeter head, but Dr. Lowe and the writer succeeded after many trials in constructing an apparatus in which a color to be estimated by a known one made with colored glasses can be compared with a single glance, because each of the two occupies half the field of view, and there is a sharp line of demarcation between them. The apparatus is made by Carl Zeiss, of Jena. The Kallab scales are used as a color-filter, but in the form of strips instead of

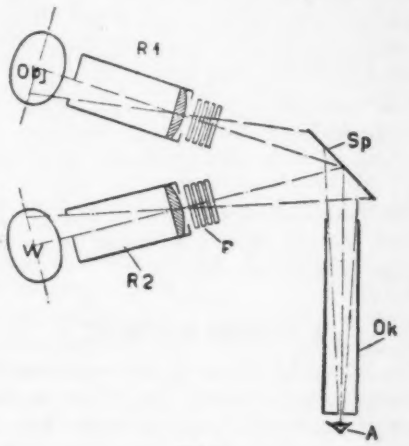


FIG. 1.

circles. Each strip consists of ten graduated hues. Grey is omitted, because it can be produced by mixing equal parts of red, yellow and blue.

Referring to Figs. 1 and 2, Obj. and W are two circular obliquely placed surfaces

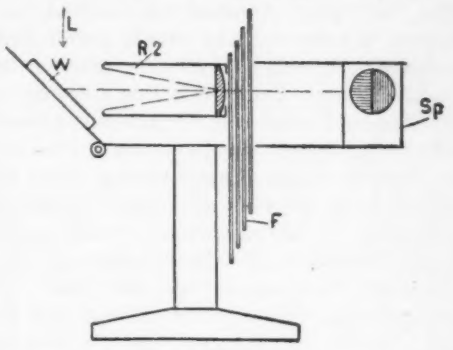


FIG. 2.

illuminated from above. The light reflected horizontally from Obj., which acts as a stretching frame for the piece of cloth, passes through a semi-circular opening into the lense-tube, R_1. The lense throws a sharp image of the straight edge of this

opening on the screen, Sp. In like manner, the light from the standard at W passes through a similar opening into R_2. The two straight edge images coincide in the middle of the field seen by an eye applied at A to the tube, Ok. The color-filters, F, can be moved vertically in front of R_2, and the numbers can easily be read off. The apparatus is capable of great accuracy, as all light except from Obj and W is cut off, and as the two colors to be compared are seen on Sp simultaneously, occupying each half the field of view and separated by a sharp line.

The best source of light is not yet fully settled, but the light used must be as much like daylight as possible.

A DYEING MACHINE

The machine shown in the accompanying illustration and which has been recently patented is described by the inventor as follows: The object of the improvement is to provide a simple and effective device in which the material to be dyed will be drawn over the rolls and submerged in the dye liquor. Another object of the invention is to so draw the material over the first roll and then another that the dye will be evenly taken up by the goods, preventing them from becoming streaked or spotted, and preventing such material as silk goods from becoming creased, rubbed or chafed in the dyeing process. Fig. 1 is a side elevation of the improved machine. In adding dyestuff while the goods are in the liquor it is necessary to keep the new material away from the goods until it has been thoroughly mixed in the liquor. To accomplish this a pipe is extended downward into the vat, then at right angles into the interior of the rolls, pipe leading from a funnel in which is placed the color. As the color leaves the pipe it is inside of the rolls, and as the roll is revolved it agitates the dye, thoroughly mixing the color with the contents of the vat.

In order that the dye may be kept at a boiling temperature, a steam pipe passes into the vat on one side, then lengthwise between the rolls. That portion of the pipe which lies along the bottom of the vat between the rolls has a number of outlets. To prevent this steam coming in contact with the goods upon the rolls which would streak the goods, baffle plates forming the arc of a circle are set between the steam pipe and the rolls.

After the goods have remained in the dye a sufficient length of time the end which is attached to the roll is removed and carried over a roller, then under the lower wringer roll, under which is placed a tray. The goods then pass between the two wringer

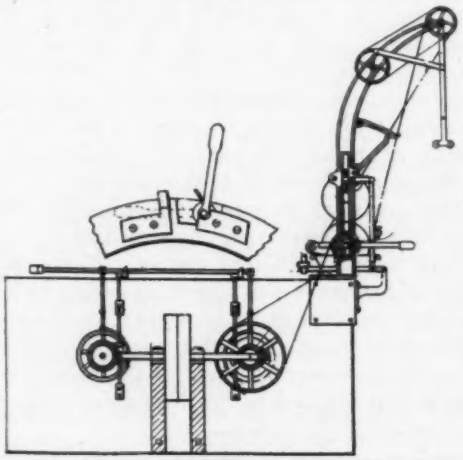


FIG. 1.

rolls, which press the water and dye from the goods. In order that the wringer rolls, Q′ and S′, may be kept constantly pressed together, a bracket is secured to the vat, to which is pivoted one end of a lever, on which is slidably fastened a yoke having an upwardly extending stack, in which may be placed one or more weights. The weight draws the end of the lever down, causing the wringer rolls to be pressed together.

While the goods are passing through the wringer rolls a stream of cold water is played thereon from the pipe, V′, so that the goods will be cooled, enabling them to be handled. After the goods have passed through the wringer rolls they run over the roll, then downward through the folding rolls, which are operated by a crank. One end of the goods is attached to one of the rolls and the goods are drawn through the dye. When this operation has continued for a while the roll is brought to a standstill,

so that the last end of the goods is at the top of the roll. This end is then attached to the opposite roll. By moving the brake and clutch rod in the opposite direction the roll to which the rear end of the clutch is attached is revolved. At the same time the brake is applied to the other roll, so that it cannot revolve faster than the roll which is drawing the goods.

When the goods has been drawn through the dye first on one roll and then the other in the manner described, for a sufficient length of time to secure the right shade, it is then drawn through the wringer and over the folder, at which time it will be ready to be removed to a convenient drying place.

REGULATING THE WEIGHT OF FABRICS IN FINISHING

BY ELMO

With the modern rotary fulling mill and its appliances for regulating the length as well as the width of the cloth in finishing, almost any desired result as to the finished weight can be obtained. In the old days when fulling was done wholly in the old fashioned fulling stocks, there was no way to regulate the shrinkage in length, except by the construction of the cloth or the twist given to the yarn, and there was bound to be a shrinkage in length whether-or-no, without any possible way of regulating it during the fulling process.

By an intelligent use of the present day fulling mills, a great variety of results may be obtained, which renders it possible to adapt the weight and compactness of the cloth to the particular finish desired. It is well understood that when the cloth comes from the loom it contains more or less grease and foreign matter, the elimination of which results in a shrinkage or loss in weight, varying according to the character and condition of the material. In figuring for a definite finished weight, one must take this into account, and either construct the cloth to allow for this shrinkage, or make it up by shrinking in length or flocking in the fulling process. In many cases where the product consists of cassimeres, dress goods and the like, the cloth is made sufficiently heavy in the loom to insure the desired finished weight without resorting to either shrinking or flocking. This does not always insure the best results, as a certain amount of fulling in length gives to the fabric a firm, soft and clothy feel that cannot be obtained in any other way. In the finishing of kerseys, broadclohs, meltons and similar goods, where a close, firm felt is required, the fulling in length is absolutely necessary if the best results are desired.

There has recently been a tendency on the part of the woolen manufacturer to make his fabric in the loom, so that the finished weight will be assured without any shrinkage in length, and in some cases with little in the width. This may result in meeting certain demands where the goods come in competition with worsteds, but it fails to insure the excellent finish that characterized the old time cassimere. In the case of medium and low grade goods, it is usually poor policy to attempt to construct the cloth on this principle, as it often requires a closer construction than the yarn warrants and leads to bad results in weaving. It is best to make up a part of the weight in finishing, and thus avoid imperfections that over-crowding in the loom tends to produce. In goods of this character the loss of weight in finishing usually varies from 18 to 25 per cent. or even more. A part of this can be made up more safely and economically by shrinkage in length than in any other way.

Aside from the loss sustained by the cleansing of the goods, there is also a loss resulting from the napping and shearing. The finisher should know from previous experience or from suitable tests just what the loss amounts to in every process, so that he can establish a standard for fulling in length to bring about the desired weight. This being done, there is no difficulty in securing desired and uniform results.

For an example of procedure we will suppose a cloth weighing 19 ounces from the loom is to weigh 16 ounces when finished, and that the total loss of weight in finishing amounts to 25 per cent. Seventy-five per cent. of 19, which represents the clean

weight of the cloth, is 14.25 ounces. If the required weight of 36 inches be 16 ounces, how many inches does 14.25 ounces represent? This is easily determined by proportion as follows: $14.25 \times 36 \div 16 = 32.06$.

This leaves 4 inches per yard to be shrunk in order to obtain the required finished weight. To avoid the necessity of repeating this calculation a table like the following may be made out to show the shrinkage required for each piece of cloth as it goes into the fulling mill:

LINEAR SHRINKAGE

Loom Weight	17	17.5	18	18.5	19	19.5	20
% Loss in Wgt.	Inches to be shrunk to finish 16 oz.						
15	3.5	2.5	1.6	.6	..	..	..
17.5	4.4	3.6	2.6	1.6	.7	..	..
20	5.4	4.5	3.6	2.8	1.8	.9	..
22.5	6.4	5.6	4.6	3.7	2.9	2.0	1.1
25	7.3	6.5	5.6	4.8	4.	3.1	2.2

To make the shrinkage permanent and effective it should not be hurried. Putting on heavy weights for the shrinking boxes and forcing the shrinkage up hurriedly tends to give a spongy effect, and the pieces will be partly drawn out in the subsequent processes. Carrying the shrinkage in length along with that in width, will give a firm and compact fabric.

In the finishing of some light goods, such as dress goods, the stretchers in front of the mill may be used to avoid shrinkage or to gain in length. A manufacturer running on dress goods weighing 4.5 ounces finished, 36 inches wide, woven two widths in the loom, told the writer that he stretched his goods sufficiently in fulling to pay for the weaving.

Where goods finish sufficiently heavy without shrinking, a soft effect may be obtained by using the shrinking boxes for a time and then taking them off and using the stretchers to restore the former length. This does not increase the weight, but it gives a more felted appearance to the cloth and improves the handle. This must be done very carefully as to time of shrinking, so as to get uniform results. There is a tendency for the washing and other processes to draw out some of the shrinkage, this varying with the character and stability of the goods. By noting the final weight, one may easily learn to exceed the table calculations enough to get good results.

In marking off a yard in length for the purpose of measuring the shrinkage, it is best to use a contrasting color of fine cotton twine, sewed in about six inches from the selvage. If the mark is in the selvage it will not always be reliable, as the selvage is often slacker than the body of the cloth and not infrequently shrinks more or less than in the body of the piece. If the thread is sufficiently fine it will do no harm to leave it until the cloth is dried, enabling one to see how the shrinkage holds out in washing.

Adding to the weight by the use of flocks necessitates great care in order to avoid a waste of the flocks and to get good and uniform results. There are two ways for applying the flocks, called the dry and wet methods. By the former the flocks are put into the fulling mills before the soap is applied, and allowed to run ten or fifteen minutes, which is supposed to distribute them evenly. This is followed by soaping. By the wet method the flocks are put on at intervals after the goods begin to full. The cloth is previously prepared by having the selvages sewed together, so that no flocks will get on the face. Where little flocking is done the dry method may be employed. Heavier flocking leads to a waste of flocks and often a failure to get on the required weight. The cloth can take up but a limited amount while in the dry state, and the result is that the surplus remains in the bottom of the mill or lodges around the boxes where it does no good. The cloth does not begin to full until the soap has thoroughly cut the grease, and it requires from 20 to 30 minutes for this result to be brought about. Then the cloth begins to lose its hard, wiry feel and show signs of fulling. While this is taking place, the flocks that have been put on by the dry method will readily absorb the soap and begin promptly to full, but not to the cloth. They often roll into little pellets and felt in this shape, so that when the cloth is in a condition to full they fail to adhere to the fabric and go to waste. When the wet method is employed the cloth is allowed to run until the fulling is well started, when a sufficient amount of flocks to cover the cloth is sprinkled evenly upon the piece in the back of the mill. The raised fibers of

the cloth catch on to the flocks at once, and both unite in the felting process before there is any opportunity for the flocks to become felted independently. When these flocks are felted to the cloth more should be applied, and proceeding thus as the work advances. It will be found that if carefully done there will be little waste. Another advantage of the wet method is that the flocks form a paste-like union with the soap which insures their staying in place on the back of the cloth, while with the dry method they work through to the face of the cloth.

The success of the work depends very largely upon the quality of the flocks used. They should be made from good wool stock, so that they will act in conjunction with the fibers of the cloth in felting, otherwise the result cannot be satisfactory. Stock of this character does not lose its capacity to felt by being finely cut and will readily become a part of the cloth when intelligently used, while any non-felting material will either not stay put, or will shake out all along from the finishing room to the wearing out of the garment. The flocks absorb the moisture, and additional soap will have to be applied occasionally as the work proceeds. The soap should not be applied too soon after the flocks, but preferably a few minutes before. On account of the shrinkage in the flocks a larger quantity than the actual weight required must be used.

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Dye Recipes

The following recipes appear in the Dyers' Supplement, which is issued each month by the TEXTILE WORLD RECORD. The Supplement contains the colored samples, dyed according to recipes given. The selection of samples is carefully made, and it is the aim to show shades which are of especial interest to the dyer, and which the requirements of the market demand. The Dyers' Supplement is a 16-page pamphlet, in convenient form for preservation. Subscription price for the Dyers' Supplement $1.00 per year.

Recipe No. 129

ON RAW WOOL

Fustic Yellow on 100 lbs. of raw wool. Prepare a dye bath with

3% Bichromate of Potash.
3% Half Refined Tartar "C."

Bring to boil and boil 1 1/4 hours. Rinse. Dye with

10 lbs. Extract Fustic Extra.
(American Dyewood Company, 80 Maiden Lane, New York City, N. Y.)

Bring to boil. Boil 1 1/4 hours.

Fustic is recommended for its extreme fastness to light and fulling.

—:—

Recipe No. 130

BROWN ON RAW WOOL

Brown on 100 lbs. of raw wool. Prepare a dye-bath with

3 lbs. Bichromate of Potash.
3 lbs. Half Refined Tartar "C."

Bring to boil and boil 1 1/4 hours. Rinse. Dye with

10 lbs. Extract Fustic Extra.
10 ozs. Hematine.
8 ozs. Alizarine Red D B.
(American Dyewood Company, 80 Maiden Lane, New York, N. Y.)

Bring to boil and boil 1 1/4 hours.

Combinations of Logwood and Alizarine Red with Fustic as a base are distinguished by their fastness to light and fulling.

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Recipe No. 131

RED ON WORSTED YARN

Cloth Red 3 G O on 100 lbs. worsted yarn. Prepare the dye bath with

3 lbs. Cloth Red 3 G O.
(Geisenheimer & Co., 189 Front St., New York, N. Y.)
10 lbs. Glauber's Salt.
3 lbs. Acetic Acid.

Enter at 120° F., and after boiling 1/2 hour, add

2 lbs. Sulphuric Acid

to exhaust the dye bath. Finally add

2 lbs. Potassium Bichromate

and boil 3/4 of an hour.

Cloth Red 3 G O possesses very good fastness to light and its fastness otherwise is also good.

—:—

Recipe No. 132

BLACK ON COTTON YARN

Kryogene Black T 3 B on 100 lbs. cotton yarn. Prepare the dye bath with

10 lbs. Kryogene Black T 3 B.
(Badische Co., 86 Federal St., Boston, Mass.)
20 lbs. Sodium Sulphide Crystals.
10 lbs. Soda Ash.
50 lbs. Common Salt.

Bring the dye bath to a boil, enter material and dye at a temperature just under the boil for one hour.

Kryogene Black T 3 B possesses the usual fastness of the sulphur colors.

Recipe No. 133

RED ON COTTON YARN

Thio Indigo Red B G Paste on 100 lbs. cotton yarn. Prepare the dye bath with

20 lbs. Thio Indigo Red B G Paste.
(Kalle & Co., 530 Canal St., New York, N. Y.)
2½ lbs. Hydrosulphite Powder Conc.
8 lbs. Caustic Soda.

Reduction is carried out at 160° F., and when reduction is complete the bath will be of an olive color. The dyeing should be done between 90° to 100° F., for 3/4 of an hour. Then rinse, and finish in a boiling soap bath.

Thio Indigo Red B G Paste has excellent fastness to all color destroying influences.

Recipe No. 134

VIOLET ON WORSTED YARN

Indo Violet B F on 100 lbs. worsted yarn. Prepare the dye bath with

2 lbs. Indo Violet B F.
(Berlin Aniline Works, 213 Water St., Boston, Mass.)
20 lbs. Glauber's Salt.
5 lbs. Acetic Acid.

Enter material at 120° F., and raise to a boil in 3/4 of an hour. Boil for 1/2 hour, then add

1 lb. Sulphuric Acid

well diluted. Continue the boiling 3/4 of an hour longer.

Indo Violet B F possesses good fastness to nearly all of the common color destroying agencies.

Recipe No. 135

BLACK ON WORSTED YARN

Naphthylamine Black F on 100 lbs. worsted yarn. Prepare the dye bath with

6 lbs. Naphthylamine Black F.
(Farbenfabriken Co., 117 Hudson St., New York, N. Y.)
15 lbs. Glauber's Salt.
2 lbs. Acetic Acid.

Enter at 180° F., bring to a boil and dye at a boil for 3/4 of an hour. Then add

3 lbs. Acetic Acid or
1 lb. Sulphuric Acid
to exhaust the dye bath

Naphthylamine Black F possesses good fastness to practically all of the color destroying agencies.

Recipe No. 136

OLIVE ON COTTON YARN

Thiophor Bronze 5 G W on 100 lbs. cotton yarn. Prepare the dye bath with

6 lbs. Thiophor Bronze 5 G W.
(C. Bischoff & Co., 451 Washington St., New York, N. Y.)
18 lbs. Sodium Sulphide, Crystals.
5 lbs. Soda Ash.
30 lbs. Common Salt.

Boil up the bath, enter yarn, and dye at a temperature just below the boil for one hour.

Thiophor Bronze 5 G W possesses excellent fastness to light and also cross dyeing.

Recipe No. 137

BLACK ON COTTON AND WOOL UNION MATERIAL

Union Black R G D on 100 lbs. cotton and wool union material. Prepare the dye bath with

6 lbs. Union Black R G D.
(Cassella Color Co., 182 Front St., New York, N. Y.)
5 lbs. Glauber's Salt.

Enter at 120° F., bring slowly to a boil, and dye at a boil for 1/2 hour, and allow to remain in the gradually cooling bath for one hour.

Union Black R. G. D. will be found an excellent color for the dyeing of garments containing cotton and wool, and also for all mixtures of cotton, wool and silk material.

Recipe No. 138

BLUE ON COTTON YARN

Oxamine Light Blue G X on 100 lbs. cotton yarn. Prepare the dye bath with

2 lbs. Oxamine Light Blue G X.
(Badische Co., 86 Federal St., Boston, Mass.)
½ lb. Soda Ash.
25 lbs. Glauber's Salt.

Dye at a boil for one hour.

Oxamine Light Blue G X possesses good fastness for a direct cotton color.

Recipe No. 139

BRILLIANT BLUE ON WORSTED YARN

Alkali Violet 10 B on 100 lbs. worsted yarn. Prepare the dye bath with

2 lbs. Alakli Violet 10 B.
(Farbenfabriken Co., 117 Hudson St., New York, N. Y.)

15 lbs. Glauber's Salt.
5 lbs. Sulphuric Acid.

Enter at 140° F., and dye at a boil for one hour.

Alkali Violet 10 B will be found of value in the dyeing of woolen material when brilliancy is desired rather than extreme fastness.

Recipe No. 140

BLUE ON WORSTED YARN

Omega Alizarine Blue B Extra on 100 lbs. worsted yarn. Prepare the dye bath with

4 lbs. Omega Alizarine Blue B Extra.
(F. E. Atteaux & Co., 174 Purchase St., Boston, Mass.)
4 lbs. Acetic Acid.
10 lbs. Glauber's Salt.

Enter the goods in this bath at 100° F., bring slowly to a boil, and dye at a boil for one hour. Then cool the bath to 170° F., and add

1 lb. Potassium Bichromate

and continue the boiling for 3/4 of an hour.

Omega Alizarine Blue B Extra possesses very good fastness to all of the common color destroying agencies, and will be found an excellent color for the dyeing of loose wool.

Recipe No. 141

YELLOW ON WORSTED YARN

Milling Yellow G Pat. on 100 lbs. worsted yarn. Prepare the dye bath with

3 lbs. Milling Yellow G Pat.
(Cassella Color Co., 182 Front St., New York, N. Y.)
10 lbs. Glauber's Salt.
3 lbs. Acetic Acid.

Enter at 170° F., and dye at a boil for 3/4 of an hour, and then add

1 lb. Sulphuric Acid

and continue the boiling until the bath is exhausted.

Milling Yellow G Pat. will be found an excellent color for use in the dyeing of compound shades.

Recipe No. 142

VIOLET ON WORSTED YARN

Meta Chrome Violet B on 100 lbs. worsted yarn. Prepare the dye bath with

2 lbs. Meta Chrome Violet B.
(Berlin Aniline Works, 213 Water St., New York, N. Y.)
10 lbs. Glauber's Salt.
½ lb. Ammonia.

The dyestuff is dissolved in conjunction with the ammonia, and added to the dye bath through a sieve.

4 lbs. Meta Chrome Mordant

is then dissolved in boiling water, and added to the dye bath.

It is also advisable to add

2 to 3 lbs. acetate of Ammonia

to the dye bath before dyeing.

The material is entered at 100° F., and after 15 minutes the temperature is slowly raised, through a period of 3/4 to 1 hour, and then boiled for from 1 1/2 to 2 hours.

The heating must be uniform and slow in order to insure the production of level dyeings.

Meta Chrome Violet B possesses good fastness to nearly all of the common color destroying agencies, and is characterized by its brightness of shade.

Recipe No. 143

BLUE ON WORSTED YARN

Omega Alizarine Blue R Extra on 100 lbs. worsted yarn. Prepare the dye bath with

4 lbs. Omega Alizarine Blue R Extra.
(F. E. Atteaux & Co., 174 Purchase St., Boston, Mass.)
4 lbs. Acetic Acid.
10 lbs. Glauber's Salt.

Enter the goods in this bath at 100° F., bring slowly to a boil, and dye at a boil for one hour. Then cool the bath to 170° F., and add

1 lb. Potassium Bichromate

and continue the boiling for 3/4 of an hour.

Omega Alizarine Blue R Extra possesses very good fastness to all of the common color destroying agencies, and will be found an excellent color for the dyeing of loose wool.

Recipe No. 144

VIOLET ON COTTON YARN

Thio Indigo Violet B Paste on 100 lbs. cotton yarn. Prepare the dye bath with

5 lbs. Thio Indigo Violet B Paste.
(Kalle & Co., 530 Canal St., New York, N. Y.)
2 lbs. Hydrosulphite Conc. Powder.
2 lbs. Caustic Soda.

The reduction is carried out at 130° F., and when reduction is complete the bath will assume an olive green color. The material is then dyed for one hour at 140° F. Rinse and finish in a boiling soap bath.

Thio Indigo Violet B Paste possesses excellent fastness to all of the common color destroying influences.

New Machinery and Processes

This department is designed to present from month to month a brief mention of new machinery, devices and processes being brought out in this country and abroad, that are of interest to the textile manufacturers. It is not a list of patents but of improvements on the market, the idea being to present to our readers a systematic monthly record of new machinery, etc., of interest to textile mill men.

Whenever possible we endeavor to make a personal investigation of the new machinery and processes described in this department. In the absence of such personal investigation we must necessarily rely upon information obtained from those who control the machines and processes.

We invite machine builders and others to send us such information for this department.

Printing Textile Fabrics. C. Winternitz, Budapest, Hungary. An improved method of printing fabrics made of either vegetable or animal fibers. Specially prepared starch is used for thickening.

Warper Reed. Egli & Bruegger, Horgen, Germany. An improved reed for warpers which has been recently introduced in a number of German mills.

Dust Remover. Georges Fauquet, Rouen, France. An improved pneumatic device for removing dust from cotton cards during the cleaning process.

Bleaching Skein Yarn. Zittauer Maschinenfabrik, Zittauer, Germany. An improved system of bleaching and washing cotton yarn in skeins.

Braiding Machine. Emil Diebold, Ennetbaden, Switzerland. A braiding machine in which the plate ordinarily employed is dispensed with.

Dyeing Machine. Scholz & Matthesius, Crimmitschau, Germany. A machine for dyeing yarn on cops or spools or in skeins. It operates by the circulating system.

Yarn Dyeing Machine. S. Partridge & Co., Kidderminister, England. A machine for dyeing yarn in the skein. It is built on the open vat principle and provided with a lifting motion operated by worm gears.

Self Feed for Cards. Oscar Schimmel, Chemnitz, Germany, has recently placed on the market an improved self feed for first breaker cards.

Bleaching Textile Fibers. Emilien Lasbordes, Boissezon, France. A bleaching process for wool and other textile fibers. It is stated that this process is based on the bleaching properties of stearic acid.

Folding Machine. Emil Gminder, Reutlingen, Germany. A machine for folding cloth in kiers preparatory to treating the goods in bleaching or dyeing liquor.

Filling Stop Motion. T. W. Payton, Castleton, England. An improved filling stop motion for cotton looms. It is being used successfully in a number of English mills.

Automatic Looms. Harling & Todd, Burnley, England. An improved automatic cop changing loom. It is arranged to stop while the cop is being changed and is adapted for running at a high speed.

Jacquard Mechanism. S. Dracup, Great Horton, Bradford, England. An improved jacquard lifting mechanism which, in addition to a number of other features, occupies less space than usual, thus giving more room in the aisles between the looms.

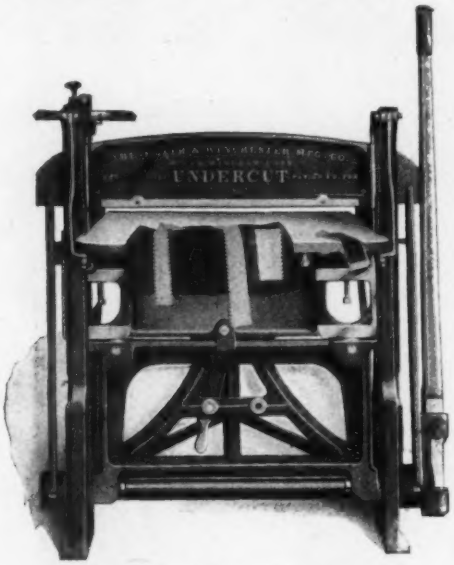
Tension Regulator. Hermann Kestner, Muelhausen, Germany. An attachment to ring spinning frames for regulating the tension of the yarn. It is placed between the delivery rolls and the ring.

Warp Friction. Franz Bajer, Prossnitz, Austria. An improved warp tension device for looms.

Ring Spindle. J. Hetherington & Sons, Manchester, England. An improved spindle for ring frames.

A CLOTH CUTTER

The cloth cutter, shown in the illustration, is built by the Smith & Winchester Mfg. Co., South Windham, Conn. Time and labor is saved by this machine by reason of its being self-clamping. The improved clamp, front and special back gauges give most satisfactory result in cutting cloth or paper with either straight or scalloped edges. The sizes to be cut may be quickly adjusted by means of the index hand wheel, or by the use of the small gauge upon the



A CLOTH CUTTER.

ruled front table. Upon special order they will attach to the machine an improved cut-indicator for special line work.

The advantages of the self-clamping feature are apparent compared with the ordinary clamping devices with which it is necessary to screw the clamp in position, then cut and run the clamp back in order to reset the goods before making the next cut.

By the insertion of a special knife, this cutter may be used as a pinking machine for producing samples requiring scalloped edges. The changing of the knives is easily accomplished, and demands the expenditure of a small amount of time and labor, the services of but one person being required. This quick change feature is an important feature of the Winchester machine.

By the use of the improved shifter lever, the cutter becomes universal in its action, it only being necessary for the operator to shift the lever to either stop, an exceedingly simple operation, to accomplish either straight or shear cutting. By the use of the front gauge, the cutting of stripes becomes possible. The table swings outward from the frame during the act of cutting, a feature not possible on the down-cut type of machine. All cutters over 34 inches in width are supplied with two levers, to be used for heavy cuts. For ordinary cuts only one lever is required.

The cutter is of heavy design throughout; it embodies the principles of the well-known power undercut, is made of the best materials and workmanship. Smith & Winchester Mfg. Co. have had for years a high reputation as builders of paper cutting machinery.

THE FRANKLIN DYEING MACHINE

The advantages of dyeing textile materials by the circulating system, by which the dye liquor is forced through the material have long been recognized. By this method a larger quantity of stock can be dyed at one time, thus giving greater uniformity of shade; the material, whether raw stock, slubbing or yarn, is not injured by handling, but comes from the dyeing process in the same form as that in which it entered. In addition there is an important saving of labor, steam and dyestuffs. For years the circulating system of dyeing has been in extensive use, both in this country and abroad, and has lacked only one thing to make it suitable for all classes of work, namely a certain means of obtaining a uniform density of the material being dyed in order that the dye liquor might reach every portion of the batch under the same pressure and thus subject all parts to the same dyeing action. This has been accomplished in the Franklin dyeing machine as finally perfected and built by the Franklin Process Co., Promenade St., Providence, R. I., by means of the tube shown at Fig. 1. This tube consists of

a compressible spring, covered with a knit sleeve, and on which the yarn is wound for dyeing. A number of these tubes on which the yarn has been wound are then assembled on the holder and compressed giving the entire mass of material a uniform dens-

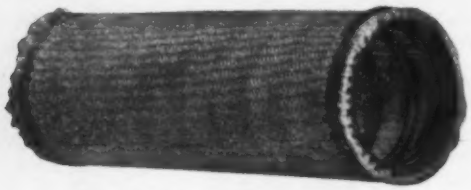


FIG. 1. FRANKLIN CONTRACTIBLE TUBE.

ity and preventing the possibility of any soft places through which the dye liquor can find a channel. This uniform density obtained by compressing the material wound on the spring tubes makes it certain that every part of the material to be dyed will be subjected to the same dyeing action of the circulating

FIG 3. TUBE PLACED ON WOOD SPOOL READY FOR WINDING.

liquor. This is the feature of the Franklin process that makes it possible to dye large quantities of material an absolutely uniform shade. It is believed that the Franklin machine is now dyeing the largest quantity of yarn ever colored at one time. One machine is now dyeing four thousand pounds of yarn a day.

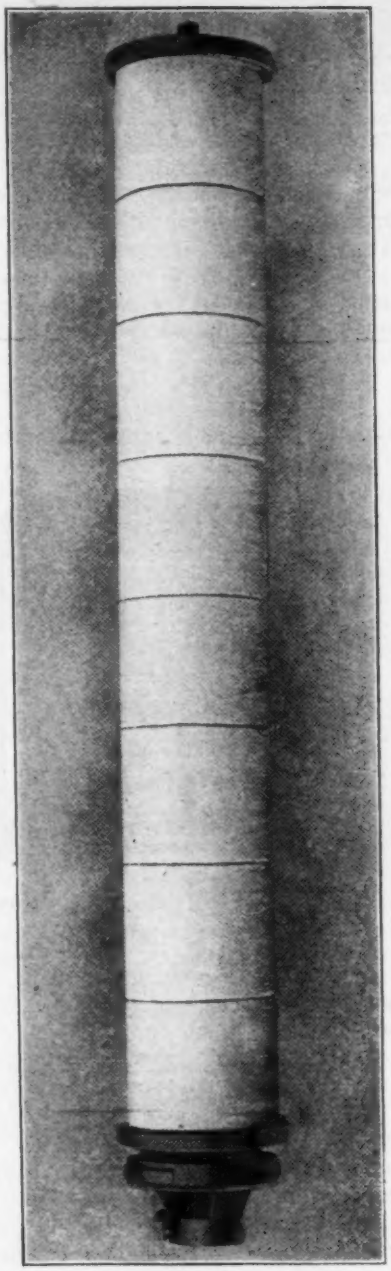


FIG. 2. YARN PACKAGES ASSEMBLED ON A FRANKLIN HOLDER.

The holders, Fig. 2, loaded with the yarn are placed in the kier of the machine, Fig. 4, by fastening them in the openings in a

false bottom provided for that purpose. The kier is connected by two pipes with a four-way valve, which is in turn connected with the suction and discharge pipes of a centrifugal pump. One of the pipes leads from the bottom of the kier; the other, from the top. The dye liquor can thus be forced from the inside of the holder to the outside, or from the outside to the interior, by swinging the handle of the four-way valve. The current is reversed in this way at regular intervals during the process of dyeing. The dye liquor is heated by a steam coil in the expansion tank of the machine shown at Fig. 4, and by a supplementary coil in the kier. Means are provided for adding dyestuffs when required, and in such a way that the additional amount is distributed uniformly throughout the material in the kier. Samples are easily unwound from any of the holders through a hand-hole in the top of the kier. After the dyeing operation is completed the liquor is run off and air is used to exhaust the surplus liquor. In this way the material is left with as small a quantity of moisture as is left by a centrifugal extractor.

The machine can be used for scouring or mordanting. The material can be rinsed by allowing water to enter the expansion tank and the waste to escape through an outlet provided for that purpose. If the material is to be steamed as a part of the dyeing process, as, for instance, in the case of an indanthrene or sulphur color, a steam connection is made under the four-way cock so that steam or a mixture of steam and air can be forced through the packages and out through the valve used for washing.

The material is then removed from the kier and dried on the holders, after which the tubes of yarn are removed. The tubes

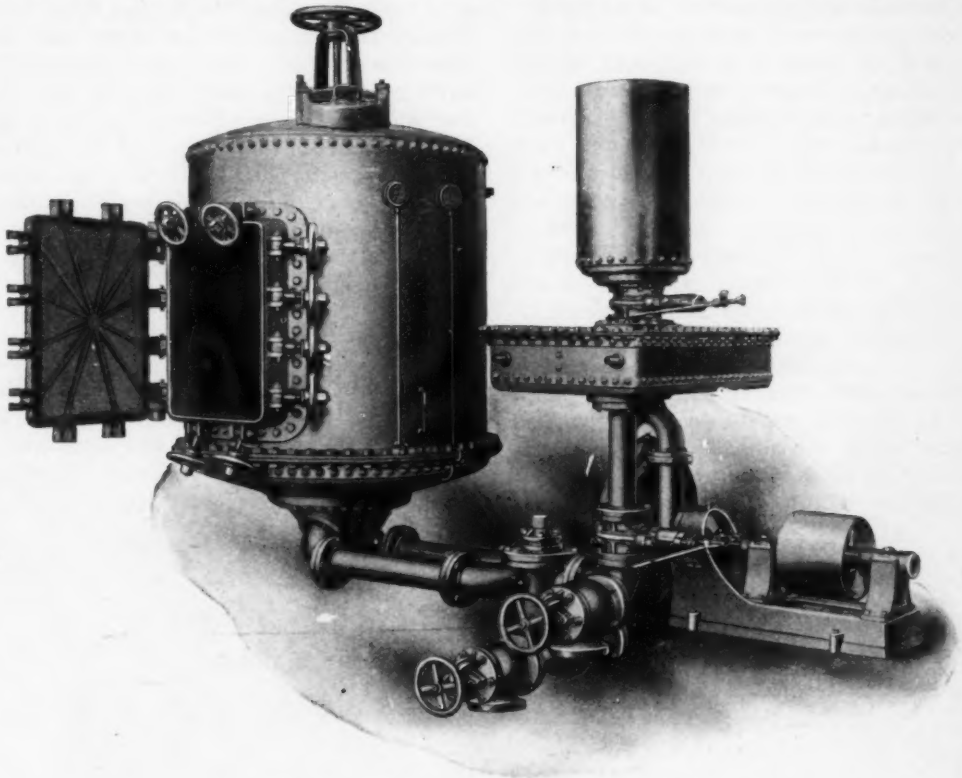


FIG. 4. THE FRANKLIN PROCESS DYEING MACHINE.

carrying the dyed yarn are then slipped on wood spools, as shown at Fig. 3, ready for winding.

In the preparation of warps, according to the Franklin process, the following operations are required: (a) Winding from the spinning bobbin onto the forty-eight inch Franklin tube or jack spool; (b) dyeing in the Franklin dyeing machine and hydro-extracting in the same; (c) drying by unrolling the dyed jack spool in multiple and winding onto a section beam at the same time; (d) assembling section beams on the slasher.

The machine may be built of steel or cast-iron for the dyeing of direct, sulphur, indigo, vat or indanthrene colors on cotton and special colors on wool. A construction of steel and cast-iron lined with lead can be used so that the whole apparatus is acid proof. The lead lined machines are used for the dyeing of wool or worsted, for developed colors on cotton and for bleaching.

The Franklin process enables the finest yarn to be dyed and subsequently handled without waste or damage. The same machine can be used without cleaning for dyeing different shades, and also for bleaching because the material does not come in contact with any metal part of the machine itself. The Franklin machine has been found perfectly suited to dyeing with the vat dyes because the stock is inclosed in a kier during the process, and oxidizing, which is a source of so much trouble with the ordinary methods of dyeing, is thus entirely avoided.

The Franklin Process Co. build the dyeing machines for sale and also operate a job dyeing establishment located within a short distance of the depot at Providence, R. I., and where they are doing a large business for mills that are not provided with dyeing facilities of their own. Some of the leading cotton mills of New England are having their yarn dyed at the Franklin plant. An interesting development of their work is the dyeing of a vat black fast to bleaching, and which is developed by the bleaching process. The Franklin Process Co. is thus equipped to supply mills with the dyeing apparatus or to do job dyeing for mills that have their dyeing done outside. Located near the Providence freight house the Franklin Co. have exceptionally good shipping facilities and the time occupied in transporting the material between their plant and the mills of their customers is reduced to a minimum. The officers of the company are F. P. Sheldon, president; H. Earl Kimball, treasurer, and J. B. Barrett, agent. Eugene S. Graves is chief chemist.

THE PERKINS CALENDER ROLLS

It is now over thirty years since the calender roll business of B. F. Perkins & Son, Inc., Holyoke, Mass., was established. As a result of their long experience and excellent facilities they are able to furnish paper, cotton and husk calender rolls in all sizes suitable for all kinds of work. All the Perkins calender rolls are fitted with a patented spline, illustrated at Fig. 1. This spline can be applied to old shafts when refilling rolls. All the paper used for the Perkins rolls is made at a Holyoke paper mill controlled by the B. F. Perkins Co. This enables them to select stock especially adapted for the purpose and to maintain a high grade. They use a special paper for the embossing rolls by which the right surface and consistency are obtained for receiving the impression from the engraved roll

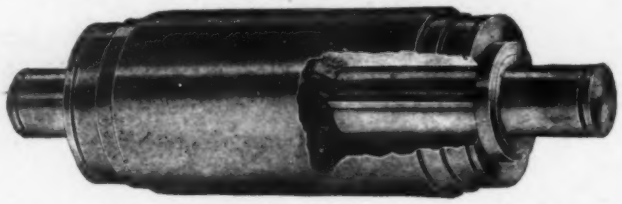


FIG. 1. THE PERKINS CALENDER ROLL FITTED WITH A PATENTED SPLINE.

and embossing or roughing the material passed between. The Perkins patented spline is especially important on this roll as by it the paper roll is kept true with the steel roll, making the pattern match accurately. The Perkins calender rolls are used for all kinds of work in finishing textile goods and dyeing or bleaching cloth.

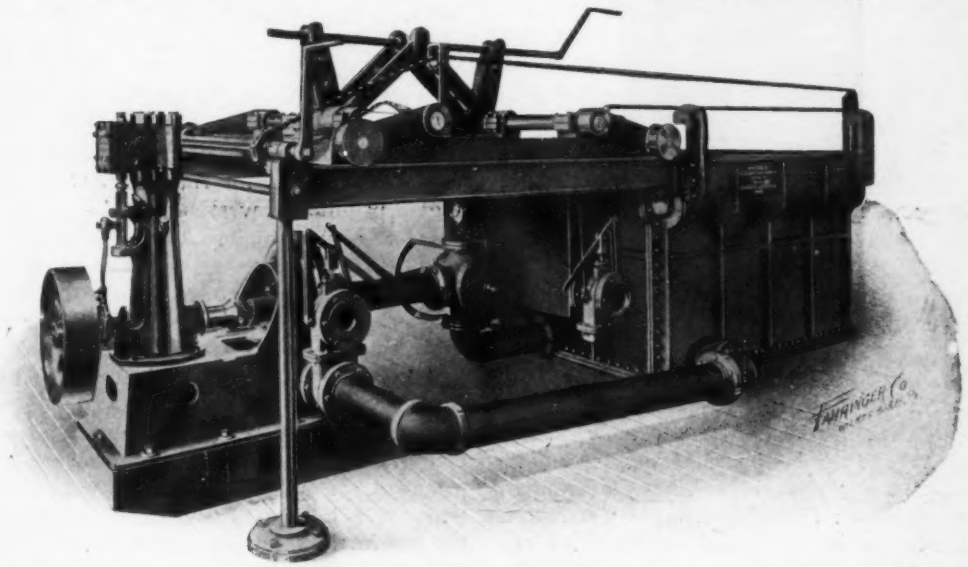
The Perkins cotton rolls are filled with special stock by a patented process, whereby short threads are run in all directions through the material, binding the whole together and giving a roll that is much stronger and more durable than one made by the ordinary method. These rolls take on an excellent surface for finishing.

A NEW RAW STOCK DYEING AND BLEACHING MACHINE

The circulating raw stock dyeing and bleaching machine, shown in the illustration, has recently been brought out by the Delahunty Dyeing Machine Co., Pittston, Pa. It is the invention of C. P. Delahunty, and is protected by patents. The machine is shown with the perforated top compressing plate raised and rolled back to permit the loading and unloading of the machine. The plate is raised or lowered by means of a right and left hand screw and lever arms. When raised by the screw the plate is pulled toward the rear of the machine by means of sprocket and link belting. This does away with all over head tracks and chain blocks such as have been used heretofore.

The new machine is set on the dye-house floor without excavation or foundation. There are no pipes under the machine and the only foundation necessary is for the engine and pump. The machine has a large boiling-out or overflow box cast on the rear tank plate, in which the steam coil for boiling dye-liquor is placed. There are no steam pipes under the bottom perforated plate in the tank, which does away with all danger of explosions from accumulated steam.

The four-way valve shown at the rear of the overflow box is used for admitting water to the machine and also for drawing off the waste liquor after the batch has been dyed. The dye liquor is introduced into the machine by a cast iron pipe having about forty openings. The perforated bottom plate rests on this pipe and the distribution of dye liquor is said to be perfect by users of the machine. The Delahunty Dyeing Machine Co. have recently installed a number of the new machines in different mills and are now building several on order.



THE NEW DELAHUNTY CIRCULATING RAW STOCK DYEING AND BLEACHING MACHINE.

The machine is used largely for dyeing and bleaching raw cotton, wool, worsted tops and slubbing. All of the cold vat colors as well as the sulphur colors have been used successfully in this machine. The Southern representative of the Delahunty Dyeing Machine Co. is A. H. Washburn, of Charlotte, N. C.

PLATFORM FOR WINDOW CLEANERS

A useful apparatus, recently invented, is a platform for window cleaners, enabling the operator to clean the windows of textile mills or other large buildings without danger or inconvenience. It is an ingenious device constructed mostly of steel with long screws

A PLATFORM FOR WINDOW CLEANERS.

running through steel tubings with brackets in the back. It locks to the window sill like a vise. The whole apparatus weighs only 26 pounds, and the work of either adjusting to the window or removing it takes less than a minute. It has a guard railing on three sides, so that the window cleaner is safe. The cut is a reproduction of a photograph taken of a window cleaner while working on a Boston skyscraper. We understand that several cotton mills have installed the platform as a regular outfit for their window cleaners. The platform is a product of the Boston Iron Works, 32 Oliver St., Boston, Mass.

FRICTION VS. ANTI-FRICTION BEARINGS FOR LINE SHAFTING

BY W. C. DuCOMB, JR.

Some interesting results were obtained from comparative friction tests of line shaft bearings recently made under the direction of S. A. Ellicson, president of the Chicago Pulley & Shafting Co. The writer was so fortunate as to witness the tests, and believes the results are of sufficient value to the readers of this publication to be brought to their attention.

Two types of bearings were used for the tests:

1, The ring oil babbitt bearing of the type in general use, illustrated by Fig. 1.

2, The roller bearings designed especially for line shafting, illustrated by Fig. 2.

Many thousands of this type of roller bearing are in use.

The object of the tests was to determine just how much less friction is found in correctly designed roller bearings operating under normal conditions of line-shaft service than in ring oil babbitt bearings under similar conditions.

With the difference in friction known, it is an easy matter to figure whether the power saved is sufficient to make the substitution of roller bearings for ring oil babbitt bearings a profitable investment. The results of these tests very plainly show this to be the case, as the power saved amounts to enough to pay for the roller bearing in from one to two years. The cost per h. p. per year and local conditions are of course the deciding factors as to the length of time required for the roller bearing to earn its cost.

So as to obtain comparable results, a specially designed testing device, shown at Fig. 3, was set up. Means were provided whereby a known load could be applied to the bearings under test, and the friction load accurately measured. Because of its simplicity both for applying load to and for measuring friction existing in the bearings under test, the results are thoroughly reliable. In fact, the results obtained from this testing device agree so closely with results obtained by the writer from an entirely different type of testing devices, as to be noteworthy. The friction was electrically meas-

ured by the testing device described in this article, while in the device used by the writer the friction was measured by the use of a lever and weight.

The results of the tests with the friction electrically measured show there is approximately 40 per cent. less friction in the roller bearing herein discussed than in a ring oil babbitt bearing of the same size. Practically the same result was obtained when the friction was measured by mechanical means, the saving shown being approximately 44 per cent. The difference in percentage of

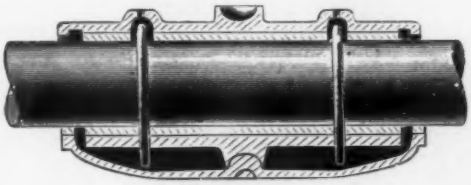


FIG. 1.

power saved is no doubt due to the belt loss existing when electrical means are used to measure the friction, as this loss does not exist when mechanical means are used.

All the bearings tested were taken from stock and therefore the percentage of saving

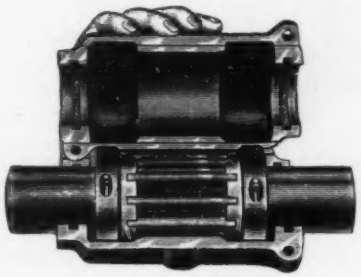


FIG 2.

shown may be considered to fairly represent average results.

The tests were made as follows: The motor was first run light, that is, without the belt, to find the power required to turn it over, the ammeter indicating .775 of an ampere. The belt was then placed on the motor pulley and on the pulley on the shaft supported by two ring oil babbitt bearings. A load equivalent to 1,200 lbs. was applied by the lever and weight, thus imposing a load of 600 lbs. on each shaft or 300 lbs. on each bearing tested.

The motor was started by throwing slowly over the lever on the starting box. After the first high reading, due to starting the shaft, the amperage gradually dropped until 1.4 ampere was indicated, when the reading remained constant.

The difference between 1.4 amperes and .775 of an ampere required to run the motor is taken as the power loss in the ring oil babbitt bearings. This difference is .625 of an ampere for the two bearings.

The belt was moved to the pulley on the shaft supported by two roller bearings, the load being the same as in the test of the ring oil babbitt bearings. The shaft started with ease, and the pointer settled at 1.15 ampere in a short time. The difference equals .375 of an ampere, which is taken as the power loss in the two roller bearings.

With these figures before us, the saving in friction of the roller bearings over the ring oil babbitted bearing can be ascertained. Upon deducting .375 from .625 we find a saving in two roller bearings of .25 of an ampere. This is equivalent to a saving of 40 per cent. of the power loss in ring oil babbitt bearings, when operating under perfect conditions. Now what does this represent in h. p.? At 220 volts we find a gain of .25 ampere, equal to one twenty-seventh of a h. p. per bearing. By using twenty-seven 1 15/16-inch roller bearings one h. p. is saved. Taking the average cost of a h. p. per year at $50.00, the bearings have earned their cost inside of two years. The conditions under which the bearings were tested were perfect, and the friction found in the babbitt bearings was less than would be found in bearings in actual service. It is, therefore, reasonable to expect a greater saving than is shown by these tests. As a matter of fact, a year and a half's use will usually effect a saving which will pay for a roller bearing, and the author has investigated many installations where the roller bearings have paid for themselves in the first year.

A very good demonstration of the small amount of friction in the roller bearings tested was shown by the use of a piece of fish line for a belt in place of the 2-inch leather belt used for making the tests. No difficulty was experienced in starting and running the shaft mounted on the two roller bearings with a load of 300 lbs. on each bearing, whereas it was impossible to start the shaft on the ring oil babbit bearings even when most of the load was removed.

lubricate the roller bearings. This compound is similar to a non-fluid oil, and has been found best suited for the lubrication of ball and roller bearings. Oil was also tried in the roller bearings, and practically the same results obtained as when the special lubricant was used. The only difference observed is that slightly less effort is required to start the shaft when oil is used. This is no doubt due to the viscosity of the special lubricant which approximates that of

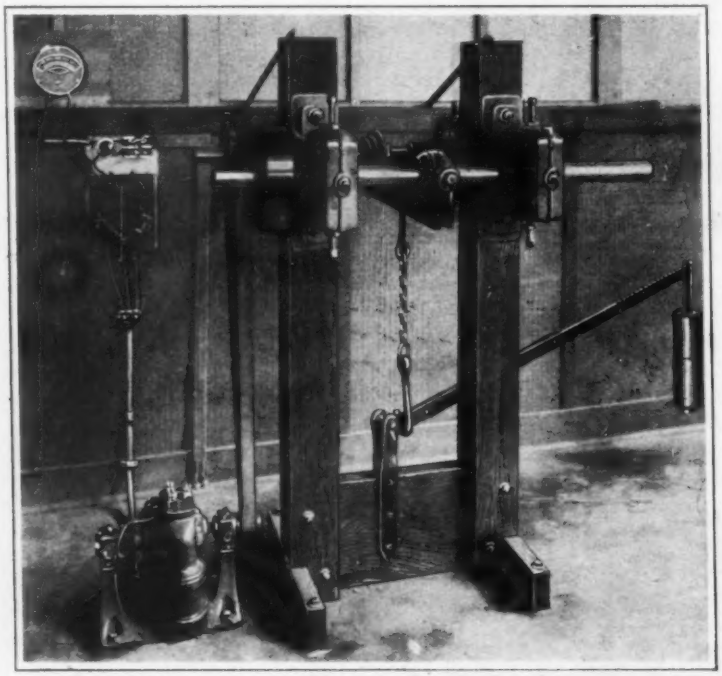


FIG. 3.

It is a generally accepted fact the coefficient of friction in a roller bearing decreases as the load increases within the capacity of the bearing. In order to demonstrate this to be a fact, a load of 450 lbs. was imposed on each roller bearing, and but little increase in friction noted, while in the case of the babbitt bearings the increase in friction was quite marked.

The bearings tested were well lubricated, a high grade machine oil being used for the ring oil babbitt bearings, and a lubricant named "Rollerine," specially compounded for ball and roller bearings was used to

vaseline, though of course it is of a different composition.

In this connection, it was noted the shaft mounted on ring oil babbitt bearings required many times the effort to overcome the starting friction that is required to keep it in motion. The reason appears obvious —when the shaft is stationary the oil flowed from between the shaft and the babbitt on the side of the bearing under pressure, so that practically a metal to metal contact exists; after the shaft makes several revolutions an oil film separates to some extent the shaft from the babbitt and much less

effort is required to keep the shaft turning than to start it. On the other hand, when rollers are interposed between the shaft and bearing, probably only as much as is required to overcome the inertia of the shaft, pulleys, etc. After the shaft is revolving, the friction is also much less in the roller bearing than in a ring oil babbitt bearing.

Fig. 3 shows two shafts supported in bearings held in four post hanger frames. These are bolted to opposite sides of a timber frame, which is secured to the floor by lag bolts, and braced to the wall, so as to prevent vibration. Both shafts are 1 15/16 inches in diameter, this size being selected for the reason that it is used to a greater extent than any other size. One of the shafts runs in the ring oil babbitt bearings, and the other shaft in two roller bearings.

A pulley of the same dimensions was put on each shaft, and the motor was placed so as to allow the belt to be moved from one pulley to the other. Care was taken to have the distance from the center of the motor shaft to the center of each test shaft the same, so as to maintain equal belt tension with the belt on either pulley. It will be seen that by placing the belt first on one pulley and noting the friction as indicated by the ammeter placed on the wall over the starting switch, then moving the belt first on one pulley and noting the friction as indicated by the ammeter placed on the wall over the starting switch, then moving the belt to the other pulley and noting the friction in the same way, the difference in friction in the two sets of test bearings can be readily ascertained. Before making the test the number of amperes required to turn the motor over was observed, and therefore the actual amount of current lost in friction in both sets of test bearings was shown.

The load was applied to the bearings under test by a weight and lever connection being provided to impose a load on both shafts simultaneously. A ball bearing of the self aligning type was placed on each test shaft midway between the bearings under test and a cross-bar attached by links to the casting housing each ball bearing. To this cross bar, at a point equidistant between the two shafts, a connection is fastened and extends downward forming one fulcrum for the lever, which it will be noted rests upon it. The other fulcrum of the lever is held in the straps bolted to the timber frame.

By alternating the position of the weight on the lever, the load on the bearings may be changed to represent different belt pulls. It will be observed the load on each test bearing is exactly one-quarter of the load transmitted from the lever by the connection to the cross-bar, as each ball bearing receives one-half of the load from the cross-bar, and being placed midway between the test bearings, one-half of this load, or one-quarter of the total load is sustained by each test bearing.

It is assumed the friction in the ball bearings used to apply the load is the same in both bearings, and as the tests are comparative this friction need not be considered. Shaft collars are provided to hold the shafts in position endwise, and ball thrust collar bearings are interposed between these collars and the ends of the bearings, so as to avoid indicating any slight friction from end thrust on the ammeter.

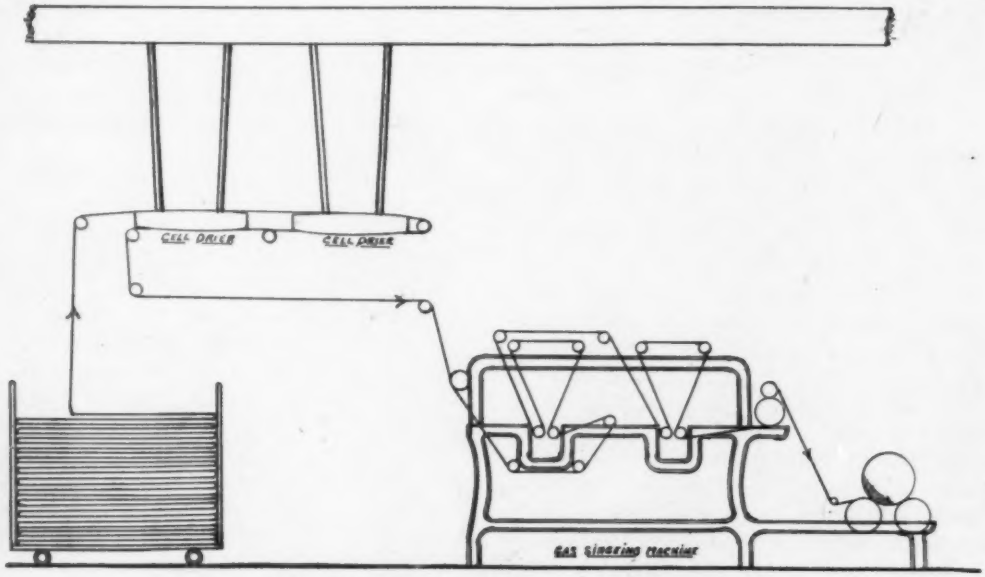
Both types of bearings tested are so well known as to make a detailed description superfluous. The ring oil babbitt bearing is of the ball and socket type, and is reamed to a diameter slightly larger than the shaft. Two rings are provided to carry the oil from the oil well below the bearing proper to the shaft, thus affording means for continuous lubrication. The roller bearing is the Sells. It is designed to fit into the same hanger frames as the ring oil babbitt bearings, size for size. In substituting the roller bearing for babbitt bearings, the same hanger frames can be used. All parts of the bearing are split, which makes it an easy matter to put them on shafting in position. The roller bearings consist of four parts: (1) the split bushing covering the shaft; (2) the split collars clamping the bushing to the shaft and retaining the roller structure; (3) the split roller structure holding, aligning and separating the hardened and ground rollers; (4) the split box with a milled joint containing the raceway upon which the rollers operate.

SINGEING COTTON FABRICS

BY JOHN D. STREET

After the sewing and marking of the pieces in the grey the first process is that of singeing, which is accomplished by either passing the fabric over copper plates, generally three in number, heated to a "whiteness" by fire from coal, coke, oil or gas fuel. The purpose of this singeing is to burn off the Cnap or fuzz so that when the piece is finished it will have a smooth look as well as a fine feel. Some fabrics are better singed over plates, while others, gas is preferable. Cotton cloth is a great absorber of moisture, sometimes taking up as much as 10 per cent. The question of moisture is familiar to everyone connected with the finishing business, but many finishers, and very good men at that, think that by devoting one-third of the singeing capacity, either one plate or one row of burners, for the drying out, they obtain a good singe. With that theory I must beg leave to differ. Moist and cold cloth coming in sudden contact with the intense heat has a tendency to shrivel and the fiber is injured. Then again, when the cloth contains moisture the nap lays snug to the fabric and the singeing machine has nothing to work on, hence we might call it an operation of no value. In France, as well as in England, it is the practice to use in connection with either the gas or plate singers, some drying cylinders, for the purpose of evaporating the moisture before the cloth reaches the flame or heat. These cylinders naturally take up floor space and always entail a certain amount of yearly up-keep.

Within the last few years many finishing plants in the States accomplish this drying out by the use of a few cell driers, which are suspended to the ceiling and generally over the truckful of goods, as shown in the accompanying drawing. The cloth passing over the two faces of these stationary cells is dried, warmed and the nap ruffled up so that when it reaches the singeing machine there is something for that machine to work on. One of the many features favorable to the cell drier is that there is no upkeep to be considered. The first cost is the only one and the machine will last as long as the mill stands. A reducing valve between the boiler and the cells and a steam trap are all the accessories required.



DRYING CLOTH BEFORE SINGEING WITH THE CELL DRIERS.

Personals

Edward Beattie, overseer of the Spinning Department of the Oxford Linen Mills, North Brookfield, Mass., has resigned and his position has been filled by Frank McDonald, of Belfast, Ireland.

Walter J. Smith, overseer of dyeing and finishing for the Forestdale Mfg. Co., Forestdale, R. I., has resigned.

George Swallow, overseer of carding and spinning for the Narragansett Worsted Co., North Oxford, Mass., has severed his connection with that company.

John Toye has accepted a position as overseer of bleaching for the Union Wadding Co., Pawtucket, R. I.

C. E. Carter, superintendent of the Southside Cotton Mill, Winston-Salem, N. C., has resigned to devote his time to the Arista Mill.

Daniel Little, assistant designer for the Hoosac Worsted Co., North Adams, Mass., has resigned to accept a similar position with the North Adams Mfg. Co., North Adams, Mass.

O. D. Tessier, late superintendent for the Guerin Spinning Co., has accepted a position as superintendent for the Woonsocket Spinning Co., Woonsocket, R. I.

Lees Mallison, late overseer of finishing for the Hoosac Worsted Mills, North Adams, Mass., has accepted a similar position with the Beebe, Webber Co., Holyoke, Mass.

Milton H. Silver has accepted a position as overseer of carding at the Fabyan Woolen Co. Mill No. 2, Medway, Mass. He comes from the Great Falls Woolen Co., Somersworth, N. H.

Augustus Hemenway has been elected president of the Ipswich Mills, Ipswich, Mass., to succeed the late Amory A. Lawrence. John A. Lawrence has been added to the Board of Directors.

H. W. Fitzroy has been appointed overseer of finishing at the Kent Mfg. Co., Centerville, R. I. He was formerly overseer of finishing for the Plainfield Woolen Co., Central Village, R. I.

Alfred D. Benoit has accepted a position as overseer of spinning for the John K. Stewart Sons Co., Amsterdam, N. Y. He was formerly employed in Norwich, Conn.

W. J. Bromley has accepted a position as overseer of spinning in the Bigelow Carpet Co., Lowell, Mass. He comes from Worcester, Mass.

Geo. W. Clark has been appointed overseer of knitting for the Yale Mills, Malden, Mass.

Theo. Justice, senior partner of Justice, Bateman & Co., has severed his connection with the company.

J. H. Wilson has accepted a position as overseer of spinning, spooling and warping at the Prattville Cotton Mills, Prattville, Ala. He comes from LaFayette, Ga.

M. E. Wolfe, overseer of the Southside Cotton Mills, Winston-Salem, N. C., has resigned and is succeeded by S. C. Rodgers of Durham, N. C.

G. W. Brigman, assistant superintendent of the Maple Mill, Dillion, N. C., has recently accepted a similar position with the Holt-Williamson Mill, LaFayette, N. C.

Alexander Roberts has accepted a position as superintendent of the Woodside Cotton Mills, Winston-Salem, N. C.

Charles N. Schneider has been promoted to overseer of weaving in the Southside Cotton Mills, Winston-Salem, N. C.

S. S. Holt has secured a position as superintendent of the Haw Mfg. Co., Haw River, N. C.

P. H. Spears, overseer of spinning at the Springfield Mill, Laurel Hill, N. C., has resigned to accept a position in McCall, N. C.

Evariste Talbot, overseer of weaving at the Flint Mill, Fall River, Mass., has resigned to take charge of weaving at the No. 4 mill of the King Phillips Corporation of same city. He was presented with a gold watch and fob chain by the help in the weaving department.

Patrick Welch, for the past two years overseer of carding for the Merrimack Woolen Mills, Lowell, Mass., has severed his connection with that Company.

Samuel Rutland has accepted a position as superintendent for Ashley & Bailey Co., dress silk and tie manufacturers of York, Pa., succeeding George Greenwood. Mr. Rutland comes from Lancaster, Pa.

William J. Denico has re-entered the employ of the Locustville Woolen Co., Hope Valley, R. I., as overseer of spinning. He was engaged at Franklin, N. H.

J. H. Gardner, formerly with the Payne Mill, Macon, Ga., has accepted a position as overseer of spinning, spooling, twisting and warper, at the Porterdale Cotton Mills, Ga.

W. L. Ball has secured a position in the general manager's office of the International Cotton Mills Corporation of New York City. He was formerly agent of the Tallassee Falls Mfg. Co., Tallassee, Ala.

R. F. Fisher has accepted a position as overseer of spinning at Lexington, N. C. He was formerly employed at the Buffalo Mills, Concord, N. C.

M. C. Phillips has accepted a position as overseer of weaving for the Manetta Mills, Lando, S. C. He was formerly employed at the Holt Mills, Raleigh, N. C.

Augustus Pitman, overseer of carding and spinning at the Holt Morgan Mills, Fayetteville, N. C. has resigned to accept a similar position at Spray, N. C.

F. D. Milstead has been appointed agent of the Tallassee Falls Manufacturing Co., Tallassee, Ala. He comes from Atlanta, Ga.

W. C. Taylor has accepted a position as overseer of carding for the Marlboro Mills No. 4, McColl, S. C. He comes from the Great Falls Mfg. Co., Rockingham, N. C.

H. P. Copeland has accepted a position as overseer of carding for the Alice Mills, Easley, S. C. He was formerly employed at the Franklin Mills, Greer, S. C.

L. H. Dorcy has been appointed overseer of carding at the Eastman Cotton Mills, Eastman, Georgia.

J. A. Towle has accepted a position as superintendent of the Hillsboro Woolen Mill Co., Hillsboro, N. H. He was formerly designer for Holden Leonard Co., Bennington, Vt.

John Swift has accepted a position as overseer of carding and combing for the Bigelow Carpet Co., Lowell, Mass. He comes from the George H. Gilbert Mfg. Co., Gilbertville, Mass.

Arthur M. Whitely has accepted a position as overseer of worsted spinning and twisting for the Bigelow Carpet Co., Lowell, Mass. He was formerly employed at the Peacedale Mfg. Co., Peacedale, R. I.

Hector E. Bissilon, sewing machine fixer for Thomas Dolby Co., Watertown, Mass., has resigned to accept a similar position with a large knitting mill in Providence, R. I.

Charles O'Brien has accepted the position as second hand in the finishing department for Holden & Leonard Co., Bennington, Vt. He was formerly employed at the Aetna Mills, Watertown, Mass.

William J. Mason, overseer of spinning for the Chester Spinning Mills, Chester, Pa., has severed his connection with that company.

Nelson S. Buroilett has again re-entered the employ of the Chester Spinning Mills, Chester, Pa., as overseer of spinning.

Thomas J. Corcoran, superintendent of the Sales & Jenks Mfg. Co., Warren, Mass., has tendered his resignation.

Emil Kisro, overseer finisher for S. Slater Sons, Inc., Webster, Mass., for the past 27 years, has severed his connection with that company.

E. F. Williams, superintendent of the Hillsboro Woolen Mill Co., Hillsboro, N. H., has tendered his resignation to accept a position as superintendent of the Sales & Jenks Mfg. Co., Warren, Mass.

John H. Rawlins has accepted a position as overseer of spinning for the Delta Spinning Co., Frankford, Philadelphia, Pa. He was formerly employed at Carney, N. J.

John D. Sullivan has accepted a position with the Fort Drummer Mills, Brattleboro, Vt., as overseer of the cloth department. He has been employed for several years for the Boylston Mfg. Co. at Easthampton, Mass.

George R. Meyers, Superintendent of the Lake View Silk Mills until their liquidation has accepted a position as General Superintendent of the Gudebrod Brothers' 3 Silk Mills.

Charles Doherty, Superintendent of the H. Doherty Silk Company, Hall Mill, Paterson, N. J., has resigned and accepted a similar position with Buckley & Cartwright, of Patterson, N. J.

Oscar L. Dougherty has accepted the position as overseer of spinning at the Schofield Woolen Co., Oshawa, Ont., Canada.

William Fitton has accepted the position as overseer of the slashing and drawing-in departments of the Whitman Mill, New Bedford, Mass.

Andrew Archer has accepted the position as overseer of weaving at the Ray Mills of the American Woolen Co., Franklin, Mass. He was formerly employed at the Glen Worsted Co., Elmville, Conn.

Michael Conlon has accepted the position as overseer of carding at the Valley Queen Mills, Riverpoint, R. I.

Thomas P. McMahon, manager and overseer of bleaching at the Pottsville Bleaching & Dyeing Co., Pottsville, Pa., has severed his connection with that company.

Stanislas Rainville, for several months overseer of the weaving department at the Valley Queen Mills, Riverpoint, R. I., has resigned. Mr. Rainville is succeeded by Daniel Skedgill, who was formerly employed at the Burgess Mill at Pawtucket, R. I.

Arthur S. Thomas has been appointed superintendent of the Oxford Linen Mills, North Brookfield, Mass.

Wilfred Derar has accepted the position as boss spinner at the Red Cross Cotton Mills, New Brunswick, N. J.

Wallace B. Coates has been appointed agent of the Farwell Bleachery, Lawrence, Mass. R. V. Clogstan has accepted the position as superintendent at the same mill.

John McCall has accepted the position in charge of the sewing at the Stillwater Worsted Co., Providence, R. I. He comes from Lawrence, Mass.

V. E. Austin, overseer of dyeing at the Morrison Woolen Co., Dexter, Me., has severed his connection with that company.

Patrick Quine has accepted the position as overseer of finishing at the North Adams Mfg. Co., North Adams, Mass., succeeding Duncan Latimer.

Abram Whitaker, formerly superintendent of the Lorraine Mfg. Co., Pawtucket, R. I., has been appointed manager of the Limerick Mills, Limerick, Me.

Peter Fenton has been appointed overseer of weaving at the Flint Mill, Fall River, Mass.

Ralph F. Culver, for the last two years manager of the Holliston Mills, Norwood, Mass., has accepted a similar position with Joseph Bancroft & Sons Co., of Wilmington, Del.

Richard Boardman, general overseer of weaving at the King Philip Mills, Fall River, Mass., for the last six years, has resigned. He has been appointed superintendent of the Barnard Mfg. Co. of Fall River, succeeding William Hathaway, who has retired.

H. W. Slater has been appointed engineer at the Glasgo Yarn Mill, Glasgo, Conn., succeeding W. G. Wilson, who has accepted a position with the General Fire Extinguisher Co., of Providence, R. I.

Fred Leavitt has accepted the position as overseer of dressing at the Newmarket Mfg. Co., Newmarket, N. H.

Charles Brown, overseer of dressing at the Newmarket Mfg. Co., Newmarket, N. H., has resigned.

Charles Keough, for the past twenty-five years overseer of carding at the Valley Queen Mills, of the B. B. & R. Knight Co., Riverpoint, R. I., has resigned.

James Adams has accepted the position as superintendent of weaving at the Whitman Mills, New Bedford, Mass. He was formerly employed at the Dartmouth Mfg. Co., of the same city.

T. W. Knightly, for the past twenty years overseer of finishing at the Beebe-Webber Co., Holyoke, Mass., has resigned.

C. M. Thompson has accepted the position in charge of spinning in Mill No. 3 of the Rocky Mount Mills, Rocky Mount, N. C. He was formerly employed at Warrenton, N. C.

J. J. Huffstickler has accepted the position in charge of the spinning at the Wadesboro Cotton Mill, Wadesboro, N. C. He comes from Laurel Hill, N. C.

W. F. Campbell has accepted the position as overseer of carding and spinning at the Lakeside Mill, Burlington, N. C. He comes from Charlotte, N. C.

J. H. Williams, who has been superintendent of the Beaumont Mfg. Co., Spartanburg, S. C., for eight years, has resigned on account of poor health.

Will Moore has accepted the position as overseer of spinning at the Chadwick Mills, Charlotte, N. C. He was formerly employed at the Atherton Mills of the same place.

W. T. Bone has accepted the position as overseer of carding at the Eureka Mills, Chester, S. C. He comes from the Fulton Bag & Cotton Mills, Atlanta, Ga.

J. M. Williams has accepted the position in charge of the cloth room at the Echota Mill, Calhoun, Ga. He was formerly employed at Greenville, S. C.

G. M. Brewer has accepted the position as overseer of weaving at the Covington Mills, Covington, Ga.

H. M. Miles has accepted the position as overseer of carding at the Alta Vista Cotton Mill Co., Alta Vista, Va. He comes from Lumberton, N. C.

E. C. Herrin has accepted the position as overseer of carding at the Great Falls Mfg. Co., Rockingham, N. C.

W. D. Thornburg has accepted the position as overseer of carding and spinning at the Imperial Mills, Eatonton, Ga. He was formerly employed at the Putnam Mills & Power Co., of the same place.

P. M. Keller has been appointed superintendent of the new Prendergast Cotton Mills, Prendergast, Tenn., and W. R. Froneberger has been elected secretary and treasurer of this mill.

W. J. Willett, formerly of Kannapolis, N. C., has accepted the position as overseer of spinning at the Buffalo Mills, Concord, N. C.

B. L. Amick has accepted the position as overseer of carding and spinning at the Osage Mills, Bessemer City, N. C. He was formerly employed at Concord, N. C.

Claude Reid has been promoted from second hand to overseer of spinning at the Lowell Cotton Mills, Lowell, N. C.

G. W. Chaney has accepted the position as overseer of weaving at the Fountain Inn Mfg. Co., Fountain Inn, S. C. He was formerly employed at Liberty, S. C.

James J. McKeon has accepted the position of overseer of carding at the Enfield Mfg. Co., Enfield, Mass. He comes from Leicester, Mass.

George A. Carr, for nearly ten years treasurer of the Hamlet Textile Co., Woonsocket, R. I., has severed his connection with that company.

Jacob Clegg, overseer of the weaving department at the Ann & Hope Mill of the Lonsdale Co., Lonsdale, R. I., has resigned.

Richard D. Northrop has taken the position of assistant treasurer of the Standard Woven Fabric Co., Worcester, Mass.

Emmett Ainley, superintendent and designer of the Premier Worsted Mills, Bridgeton, R. I., has severed his connection with that company.

Walter Ball, second hand in the worsted spinning department at the George H. Gilbert Mfg. Co., Gilbertville, Mass., has resigned to accept a similar position with the Steere Worsted Mills, Providence, R. I.

John C. Ohms has been elected president of the St. Clair Hosiery Mill, Belleville, Ill., succeeding the late Philip Knapp.

A. T. Reid has been promoted to manager of the Washington Woolen Mill Co., Ellensburg, Wash.

Abraham Hanson, overseer of spinning at the Hartford Carpet Corporation, Thompsonville, Conn., has resigned to accept the position of over-

seer of drawing at the Queensbury Mills, Clinton, Mass.

Russell H. Leonard has been appointed assistant to Sidney Stevens, agent of the Ludlow Mfg. Associates, Ludlow, Mass.

James J. Armstrong has accepted the position as overseer of carding at the Dominion Textile Co., Moncton, N. B., Canada. He comes from Easthampton, Mass.

Edward Magner has accepted the position as overseer of dyeing at the Morrison Woolen Co., Dexter, Me. He comes from North Dexter, Me.

William Howarth, overseer of weaving at the Interlaken Mills, Harris, R. I., has resigned. His successor is Jacob Clegg.

Russell Mantier has accepted the position of overseer of dyeing at the Globe Woolen Co., Utica, N. Y. He was formerly employed at the W. E. Tillotson Mfg. Co., Pittsfield, Mass.

Thomas F. Butler, overseer of dressing at the Somerset Woolen Co., Monson, Mass., has resigned.

Charles Hodge has accepted the position as overseer of dressing at the Somerset Woolen Co., Monson, Mass.

Henry Boucher, overseer of spinning at the Berkshire Woolen & Worsted Co., Pittsfield, Mass., has resigned. He is succeeded by Peter Costwell.

T. Edward Hatch, for some years selling agent of the New England Cotton Yarn Co., Taunton, Mass., has resigned to go into the cotton commission business in Boston.

James Morrison has accepted a position at the Tillotson Mfg. Co., Pittsfield, Mass. He was formerly employed as second hand of spinning on the night shift at the Pontoosuc Woolen Mfg. Co., Pittsfield, Mass.

Henry W. Koehuke has accepted the position of overseer of spinning at the Brickner Woolen Mills, Sheboygan Falls, Wis.

P. W. Cochrane, superintendent of the Mayo Knitting Mills, Mayodan, N. C., has resigned to take the superintendency of the Weldon Cotton Mfg. Co.'s plant at Weldon, N. C., which position he held 10 years previously.

W. S. Wier has accepted the position as overseer of drawing at the Victor Mills, Greer, S. C. He was formerly employed at the Monaghan Mills, Greenville, S. C.

E. N. Keller, overseer of spinning at the Hannah Pickett Mills, Rockingham, N. C., has resigned.

A. T. Bennett has accepted the position as overseer of spinning at the Maplecroft Mill, Liberty, S. C.

W. L. Lowry, superintendent and manager of the Monroe Cotton Mills, Monroe, N. C., has resigned to accept a position with A. D. Julliard & Co. of New York, in the office of the New York Mills, Utica, N. Y.

George H. Riddle has been promoted from the position of overseer of weaving with the Patterson Mills, Roanoke Rapids, N. C., to assistant superintendent of those mills.

J. M. Phillips, superintendent of the Edenton Cotton Mills, Edenton, N. C., has resigned to take charge of the Edenton Machine & Supply Co. in which he is interested.

J. C. Finley has accepted the position as overseer of weaving at the Maplecroft Mill, Liberty, S. C.

M. D. Leslie, overseer of weaving at the Maplecroft Mill, Liberty, S. C., has resigned to accept a similar position at the Williamston Mills, Williamston, S. C.

W. Allen, overseer of weaving at the Arkwright Mills, Spartanburg, S. C., has resigned.

Claude Laseter has accepted a position as overseer of spinning at the Payne Mills, Macon, Ga.

E. N. Tart, overseer of the carding and spinning at the Holt-Williamson Mills, Fayetteville, N. C., has resigned.

S. R. Foyd has accepted a position as overseer of drawing at the Poe Mills, Greenville, S. C. He formerly held a similar position at the Victor Mill, Greer, S. C.

James A. Fowler has accepted the position of overseer of weaving at the Locke Mills, Concord, N. C. He was formerly employed at the Highland Park Mills, Charlotte, N. C.

J. H. Hudgens, overseer of spinning at the Maplecroft Mills, Liberty, S. C., has resigned to accept a similar position at the Alice Mill, Easley, S. C.

W. W. Cobb has accepted the position as overseer of spinning at the Belton Mills, Belton, S. C.

Louis Zanger has accepted the position of overseer of finishing at the South Bend Woolen Co., South Bend, Ind.

O. F. Tago has accepted the position of master mechanic at the Hartford Woolen Co., Hartford, Vt.

Melburne Hinde has accepted a position as overseer of finishing for the Keitch Knitting Co., Cleveland, O. He was formerly employed at St. Catherines, Ontario, Canada.

F. D. Connelly has been appointed overseer of knitting for the Earnshaw Knitting Co., Chicago, Ill. He comes from the Harvard Knitting Mills, Wakefield, Mass.

Henry Schnapper, treasurer and buyer of the Kinderhook Knitting Co., Kinderhook, N. Y., has sold his interest to his partner, Herman J. Newman. Mr. Newman will continue the business as sole proprietor.

B. F. Carpenter has accepted the position as overseer of spinning at the Perkin Hosiery Mills, Columbus, Ga. He was formerly employed at West Point, Ga.

G. W. Sheeley has accepted a position with the Monarch Knitting Co., Dunnville, Ont., Canada. He comes from Clinton, Ont.

DEATHS.

Richard J. Prince, a retired manufacturer of Philadelphia, was killed at Walnut Lane Bridge over the Wissahickon Creek. Mr. Prince has been suffering from gradual loss of sight for some years and it is believed that he walked over the edge of the bridge while strolling over the broad concrete span. He was 57 years of age and at one time was engaged in the manufacture of woolen and worsted fabrics in the Fritz Bldg., 10th and Susquehanna Ave. At the time of his death he had been selling woolen and worsted yarns.

Charles B. Trowbridge, the last of the "old school" of cotton merchants and brokers on South Water St., Providence, R. I., senior partner with his son and Henry O. Potter in the firm of D. Remington & Son, committed suicide at his home on August 7 by shooting himself in the head. Mr. Trowbridge's death is attributed to the persistent thought that he was the very last of the old group of men on "the street." He was one of the oldest members of the Board of Trade, having been connected with the organization for many years. Mr. Trowbridge is survived by a widow, one son and a sister.

Sam C. Lowell, foreman of the machine shop of the Central Division of the Amoskeag Mfg. Co., Manchester, N. H., for many years, died August 13 at the age of 68 years. Mr. Lowell has served in the fire department, the city government and the New Hampshire Legislature, and rose to a high rank in Masonry. He is survived by two brothers.

Samuel Shaskan died at his home in New York City on Tuesday, August 13. He was well known in the woolen trade, with which he had been identified for the last twenty years, a part of which time with Louis Walther & Co., of Philadelphia. At the time of his death he was the New York representative for a number of woolen houses with an office in New York City.

Thomas Collins, who has been superintendent of the weaving, finishing and winding departments of the Bigelow Carpet Co., Lowell, Mass., died at his home recently. Mr. Collins was born in Halifax in 1844 and in 1866, shortly after coming to this country, he entered the employ of the Bigelow Carpet Co.

Joseph O. Foley, for the past four years an overseer at the Sheriffs Worsted Co., Fitchburg, Mass., died at his home, recently, at the age of 67 years. He was one of the best known residents of Fitchburg.

Josiah Gillmore Coburn, for a number of years connected with the Hill Mfg. Co., Lewiston, Me., died at the age of 92 years at his home in Newton, Mass. Mr. Coburn was also president of the First National Bank for 30 years, and seved as school committee. He was a member of the National American Cotton Manufacturers' Association. He leaves one daughter.

James Spencer Taylor, a retired plush manufacturer and who retired some time ago to become vice-president of the Standard Directory Co. of New York City, died at Newberg, N. Y., at the age of 52 years. He is survived by a wife and two sons.

Phillip Knap, who was president of the St. Clair County Hosiery Mills, Belleville, Ill., and also president of the Knapp Furniture Company, and also connected with the Merchants' Assn., died at his home in Belleville, Ill., after a brief illness.

James T. Bradford, for twenty years vice-president of the Broadalbin Knitting Co., Broadalbin, N. Y., died recently at the age of 69 years.

Michael E. Banrin, a well known dry goods commission merchant in Boston and New York City, died August 7 at his home in Brooklyn, at the age of 63 years. When a young man he went to New York and in 1870 became the New York member of the Boston wholesale dry goods house of Converse, Stanton & Co., with headquarters in New York.

William H. Davis, general manager and president of the Sauquoit Silk Mfg. Co., Scranton, Pa., died at the age of 62 years. He was born in Paterson, N. J., and twenty-five years ago went to Scranton to take over the management of the Sauquoit Company, then owner of a small mill. During recent years Mr. Davis branched out as an independent silk maker, having organized the Victoria Silk Mill at Taylor, of which he was president, and which is operated by his sons. He also extended the business of the Sauquoit Co., opening a branch in West Scranton and another in South Scranton. Mr. Davis is survived by a widow, four sons and two daughters.

William Taylor, for about thirty years an overseer in the mill of the Nashawannuck Mfg. Co., manufacturers of elastic webs and suspenders, died August 7 at the age of 63 years.

James Tomlinson, for several years employed as engineer at the Sagamore, Flint and Tecumseh Mills, Fall River, Mass., died at his home in that city after a short illness.

Edwin M. Hatch, formerly overseer of spinning in the Ellis & Co.'s Mills, but who retired from that position about seven years ago, died at his home in Monson, Mass., recently, at the age of 79 years.

Francis B. Holden, millionaire carpet manufacturer and native of Clinton, Mass., died recently in Yonkers, N. Y., at the age of 79 years. He was formerly head of the Alexander Smith & Sons Carpet Co., Yonkers. A widow and one daughter survive him.

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*Wisconsin, Wausau. Plans are being made for the establishment of the factory of the Wearwell Mfg. Co., recently incorporated, as noted, with a capital stock of $15,000. Shirts and women's and children's wearing apparel will be the main product, but the manufacture of underwear and hosiery also is contemplated. The promoters are P. C. Zielsdorf, B. S. Cable and J. S. Swenson.

Mill News

Those interested in receiving early and more complete investigated information of projected new mills, enlargements, improvements, fires, facts and gossip of the trade are referred to the TEXTILE ADVANCE NEWS, issued weekly by the publishers of the TEXTILE WORLD RECORD, at $15.00 per year.

COTTON.

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New Mills.

*Georgia, Dalton. Deeds of the real estate transfer of the new cotton mill site have been recorded. About $9500 was paid for the land, which embraces 330 acres and includes water rights from a large spring. This project is headed by F. T. Hardwick, treasurer of the Crown Cotton Mills of Dalton, and many of the stockholders of the Crown Mills are interested. The property purchased is in Phelps, which is about five miles south of here.

North Carolina, Albemarle. There are rumors that a new cotton mill will be located here.

*Tennessee, Prendergast. The new Prendergast Cotton Mills will begin production about Jan. 1, 1913, making 18s to 24s hosiery yarns on an equipment of 10,000 ring spindles operated by electricity, employing some 200 hands. W. J. McLendon, Jr., is president, agent and buyer and W. R. Froneberger, treasurer. The company as a capital stock of $100,000.

*North Carolina, Salisbury. It is reported the Princeton Cotton Mills Co., incorporated in April, has awarded contract to D. K. Cecil of Lexington for the erection of a mill in which 3,000 spindles and 36 looms to make table damasks will be installed. The building will be equipped with electric drive.

*Pennsylvania, Clifton Heights. Plans for the new Turkish towel weaving plant in which Jos. F. Cumberland and others are interested are being worked out slowly and a full report cannot be given. It is understod that about 40 looms will be operated. A location has not been decided upon as yet.

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Enlargements and Improvements.

*Connecticut, Danielson. New machinery is being received from time to time by the new Danielson Cotton Co. and it is expected the plant will be fully equipped ready for operation within three months. More power will be required and two new turbine water-wheels, each of 400 h. p., are to be installed. All of the old machinery that is to be taken out has not been removed as yet, but the work is well advanced.

Georgia, Columbus. A new building, to be one story high, 200 by 150 feet, and to be used as a cloth room, will be built for the Columbus Mfg. Co. from plans prepared by Lockwood, Greene & Co., Boston. This increase in the cloth room facilities will be required when the new installation of 400 automatic looms which will shortly be made is completed.

*Georgia, Dallas. A decision has not been made by the directors of the Paulding County Cotton Mfg. Co. in regard to the proposed installation of new spindles and preparatory machinery. There is a lot of vacant space in the old mill which it was proposed to use.

*Georgia, Eatonton. Details of the proposed addition to the Imperial Cotton Mills have been finally decided upon and contract for the construction of the building has been awarded. Fifteen cottages also will be built. The executive office is at Concord, N. C.

*Georgia, Newnan. It was noted in May that the McIntosh Mills would change from steam to electric power before the 1st of October. These plans have been completed and electrical equipment has been ordered, including 17 motors of 5 to 100 h.p., three 200 and two 15 K. V. A. transformers.

*Massachusetts, Fall River. It has been noted that the Troy Cotton & Woolen Mfg. Co. have awarded contract for a new boiler house to take the place of the present boiler house, and that the quarters now occupied for this purpose will be equipped with machinery. They have not taken up as yet the matter of the new machinery to be installed in the old boiler house.

Massachusetts, Fall River. Plans have been made for an addition by the Fall River Iron Works Co. in which the offices of the superintendent's department and the bookkeeping department will be located. The new building will be located between No. 1 and No. 2 Mills and will be of brick construction, two stories high.

*Massachusetts, Fitchburg. Construction work is finished on the 4-story addition, 100 by 137 ft., built on Mill A of the Parkhill Mfg. Co. The first floor has been equipped as a finishing department. The second floor is to be used for manufacturing, while the third and fourth floors will be used for storage purposes. There will be no additions to the equipment at present.

Massachusetts, Indian Orchard. The Indian Orchard Co., manufacturers of cotton warps, fancy yarns and colored and white carded cotton, are building a new mill.

*Massachusetts, Lowell. The directors of the Hamilton Mfg. Co. are giving consideration to plans for two large additions which it has been reported would be built either this fall or next spring. One of the additions is to be a six-story mill, 700 feet long, and the other an extension 260 feet long, to be built on the mill recently completed.

*North Carolina, Concord. The addition being constructed at the plant of the Young-Hartsell Mills Co. is for an additional opening room.

North Carolina, High Shoals. Old looms are being replaced by the High Shoals Co. with 125 new automatic looms.

North Carolina, Newton. Before fall, the Ridge View Cotton Mills will be equipped with machinery and started up. It is reported that 5000 spindles for making cotton yarns will be installed. In February, it was reported that W. H. Shuford of Hickory had purchased these buildings.

*North Carolina, Randleman. From three to four months will be required for the changes under way and contemplated by the Deep River Mills, previously reported. J. C. Watkins is the president and treasurer, and R. P. Deal, manager and buyer.

*North Carolina, Roanoke Rapids. An extension will be built on the weave shed of the Rosemary Mfg. Co., which will be 60 ft. long, and additional looms will be installed. A structure, 100 by 100 ft., to give additional repair and supply room facilities, will also be built. In addition to these improvements, cards and spindles are being installed in the spinning mill, and the company has under construction the erection of an entire new plant. Thompson & Bro. of Birmingham, Ala., have the construction contracts.

North Carolina, Sanford. The Sanford Cotton Mills will add one opener, 4 cards, 1,500 spindles, one spooler and one speeder and slubber, all of which have been contracted for. Reports that 15,000 spindles and 150 new looms would be installed in a new building to be constructed are in error. No new building is contemplated and the only addition to the equipment are those given above.

Rhode Island, Cranston. According to report, the United Lace & Braid Mfg. Co., with plant at Coventry and offices in Providence, have begun the erection of a two-story brick building on land which they have leased on Wellington Ave. Beaded tip shoe laces are a large part of the company's product.

*Rhode Island, Providence. Work has been finished on the new weave shed of the Interlaken Mills at Harris, and machinery is now being installed. The contractor is working on the new office building. Full details have been given previously, including reports that the capacity is being increased to 35,000 spindles and 800 automatic looms.

*Rhode Island, Warren. About 4000 spindles will be installed in the Cutler Mills and a new line of carpet yarns and miners' wick will be made. George S. Collins of Central Village, Conn., who has manufactured miners' and candle wicking for twenty-five years or more, has become financially interested in the Cutler Mills and is now superintendent.

*South Carolina, Anderson. Contract has been awarded to the Fiske-Carter Construction Co. of Greenville for the recently reported addition to the plant of the Toxaway Mills. As noted, this is to provide for an increase of 12,000 spindles and 300 new looms.

*South Carolina, Easley. Good progress is being made on the three-story brick mill, 342 by 105 feet, for the Glenwood Cotton Mills. This building is of brick and concrete construction and will cost about $80,000. It has been noted that 20,000 spindles and 560 looms, with steam power equipment, will be installed. The total cost will be in the neighborhood of $400,000. Recently the capital stock was increased from $240,000 to $600,000. Machinery equipment will be installed during September.

South Carolina, Greenville. About 10,000 spindles and 200 looms will be added to the equipment of the Brandon Mills to utilize their present floor space. In connection with this addition the capital will be increased from $900,000 to $1,500,000. J. I. Westervelt is president and treasurer.

*South Carolina, Greenwood A 132-foot extension is being built on the main building of the Greenwood Cotton Mill, of brick and concrete construction. A recent increase in the capital stock from $500,000 to $900,000 has been noted.

*South Carolina, Lancaster. Contract has been awarded for the erection of the new buildings for the Lancaster Cotton Mills, the larger of which, to contain the company's spinning machinery, will be 900 by 237 feet. A smaller building to contain engine-house and boiler-room will be built, and also an extension to the present mill building, 127 by 112 feet, which with the original building will house the weaving department. This work will provide, as previously reported, for an increase in equipment of 60,000 spindles and 1,500 looms.

South Carolina, McColl. Twenty-five new looms have been purchased by the Marlboro Cotton Mills to increase the output of tire fabrics.

*South Carolina, Ware Shoals. Preparations are being made by the contractors to begin work on the new 3-story reinforced concrete addition for the Ware Shoals Mfg. Co. The Gallivan Co. of Greenville has the contract.

*Texas, Cuero. Before Sept. 1 plans and specifications will be completed contracts awarded and work started on the several extensions and improvements voted at the recent meeting of stockholders of the Guadolupe Valley Cotton Mills. The enlargements include the erection of a cotton warehouse, one story high, 100 feet spare, and a wing on the main building, 50 by 60 feet, to be used as a cloth room.

*Texas, Denison. New equipment which it has been reported would be installed in the plant of the Denison Cotton Mill Co. has been received. There will be 1872 spindles added, new cards and fifty 30-inch looms. They are equipping the surplus floor space with additional machinery and replacing some of the old equipment. W. B. Munson is president, W. B. Munson, Jr., treasurer and buyer, and Thomas Howarth, superintendent.

*Virginia, Danville. The new mill of the Riverside & Dan River Cotton Mills, contract for which has been awarded to T. C. Thompson & Co. of Charlotte, will represent an outlay of nearly

$1,500,000. Two buildings will be built, one a spinning mill of 75,000 spindles, 156 by 461 feet, and the other a weaving mill, two stories high, 315 by 450 feet, of brick and concrete construction. Nine months is the time given for the completion of the work.

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Mills Starting Up.

Georgia, Lagrange. The Park Cotton Mills will resume manufacturing in September. They have been idle for about four years. The plant contains 2,000 ring spindles and 52 looms on which drills have been woven.

South Carolina, Greenville. Part of the plant of the McGee Mfg. Co. has been started up on waste yarns after an idleness of several months. Henry P. McGee, the president and treasurer, is quoted as stating that the manufacture of waste yarns is only an experiment and if it proves to be profitable will be continued, working up the waste of the local mills.

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Mills Shutting Down.

Massachusetts, Amesbury. The Amesbury plant of the Hamilton Woolen Co. is to be discontinued and the business at Globe Village, in Southbridge, greatly developed. No time has been set for the shutting down of the Amesbury plant, as there are large orders to be worked up. The company has in the recent past built extensive enlargements at the Globe Village plant and has plans for other new buildings which have not been fully worked out. C. A. Coleman, treasurer of the company, states that the idea is to discontinue the Amesbury plant and to develop the Globe Village plant and that developments along this line have been in process for some time. Mr. Coleman denies the report that the mill at Fiskdale will be utilized for the business carried on at Amesbury.

Pennsylvania, Philadelphia. The Frankford Manufacturing Co., operating 44 looms at Leiper and Unity Sts. on Turkish towels, have sold out their plant to Crawshaw Wolfenden, dealer in second hand machinery and yarns at Bodine and York Sts., who is arranging for its sale to other parties.

WOOLEN.

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New Mills.

*Maine, Corinna. A force of men is busy on the foundation for the new Corinna Mfg. Co.'s woolen mill. The plans are being drawn by Herman Goodrich of Newport, and will be completed within a few days. The mill will be 52 by 120 feet, two stories and basement, of heavy mill construction, and will be equipped with a sprinkler system. It is designed for 6 sets, but operations will be started with two sets. The capital stock is $50,000; J. H. Winchester is president, John E. Gray, treasurer and buyer, and F. J. Ward, superintendent.

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Enlargements and Improvements.

*Connecticut, Stafford Springs. Work is nearly completed on the new two-story brick storehouse of the Warren Woolen Co. which is being erected to take the place of five old wooden buildings. There will be no increase of equipment.

Maine, Springvale. An addition is to be built to the plant of the Springvale Spinning Co. which will give practically double the present capacity. An extensive installation of new equipment was made in the fall of 1911.

Massachusetts, Monson. Increases at the plant of A. D. Ellis & Sons include the erection of a small brick addition to the No. 1 Mill and the addition of a few looms.

New Jersey, Camden. Clark & Jones, proprietors of the Salisbury Worsted Mills, are preparing to remove their plant from Second and Erie Sts. to Sixth and Byron Sts., where a new two-story-and-basement building, 155 by 42 feet, has been erected for their use. The output will be largely increased.

Ohio, Cleveland. The Cleveland Worsted Mills Co. has awarded contract for an extension to be built on the building used as a picking and mending department, which will be 50 by 80 feet, five stories and basement.

Pennsylvania, Philadelphia. Arrangements have been completed by Robert Krook, manufacturer of carpet and rug yarns on 6 sets, 832 mule spindles, for the erection of a new building of concrete, one story and basement, into which he will remove as soon as completed. The new building will be located on the vacant lot adjoining his present location at Main St. and Walnut Lane and the operation will be started early in the present month.

*Pennsylvania, Philadelphia. The Oettel-Pirnay Co., formerly the Vervia Worsted Co., located at Kensington Ave. and Venango Sts., manufacturers of fine worsted fabrics, recently reported as about to remove their plant to other quarters, have leased the new two-story brick mill at B and Ontario Sts., where they will have a floor space of 156 by 54 feet on each floor. They are now arranging for the removal of their plant to the new address.

Rhode Island, Pawtucket. According to report, Messrs. D. Goff & Sons, skirt braids and mohair linings, are planning the erection soon of a new electric power plant to generate their own power.

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Mills Starting Up.

Massachusetts, Clinton. The Queensbury Mills of Worcester have leased the plant of the Victor Mfg. Co., and started up the worsted spinning department during the past week. They do not intend to run the looms. The plant contains three sets of worsted drawing, 3000 worsted spindles, two sets of woolen cards, 1200 woolen spindles and 65 looms. The Victor plant has been closed since June, 1911, but buildings and machinery were in good condition and slight preparation was necessary to start up the worsted department.

*Tennessee, Harriman. The new Harriman-Riverside Woolen Mills, organized several months ago, have begun manufacturing with two sets of cards and 35 looms.

Mills Shutting Down.

Wisconsin, Beaver Dam. The Woolen Mfg. Co. is running out stock preparatory to shutting down indefinitely. Fancy cassimeres have been made on 5 sets and 26 broad looms.

KNIT.

New Mills.

*Canada, Ontario, Niagara Falls. The Visor Knitting Co., of Niagara Falls, N. Y., manufacturers of high grade sweater coats, intend to establish a branch plant here by Jan. 1, 1913. It is planned to manufacture a complete line of sweater coats in Canada. The starting up of this plant will not affect the plant at Niagara Falls, N. Y., which will be continued on a slightly enlarged scale, and will remain the head office and plant. The proposed Canadian plant will be run strictly as a branch. It has been noted that negotiations are under way for the lease of the old Armory here.

Illinois, Highland Park. The Exmoor Knitting Mills have been incorporated with capital stock of $1,500, by Charles H. Warren, William S. Chilson and C. E. Thompson, to manufacture sweaters, bathing suits, etc.

Maryland, Hancock. According to report, quarters have been leased in the Masonic Temple building by the Antietam Knitting Co. of Hagerstown, who will equip a plant at a cost of about $10,000. The company manufactures men's half hose.

Massachusetts, Wakefield. The Middlesex Knitting Co. has been incorporated with capital stock of $10,000 to manufacture underwear and sweater coats by R. E. Fairbanks, president; A. H. Fairbanks, treas, and W. A. Hendrickson, clerk. Space in the Taylor Bldg. has been leased and 6 knitting and 8 sewing machines will be installed before the 1st of Sept. At first the product will be confined to full fashioned knitted jackets and sweater coats of a high grade for men and boys. A. H. Fairbanks, the treasurer and buyer, is a graduate of Lowell Textile School and has been employed by the American Woolen Co. and the American Felt Co. Mr. Hendrickson has had considerable experience in the manufacture of knit goods and until lately was employed by the American Hosiery Co., Inc., at New Britain, Conn.

*New Jersey, Woodbine. Max Janofsky, formerly with the Woodbine Knitting Co., has begun manufacturing in his new plant, making a line of sweater coats on 3 knitting machines, 5 finishing machines and 1 winder, giving employment to 6 hands.

New York, Brooklyn. An installation of knitting machines for the manufacture of fine silk knitted neckwear has been made by the Specialty Knitting Mills of 57 Hopp St.

New York, Brooklyn. The Atlantic Petticoat & Knitting Co. is the name of a new concern which has installed knitting machinery for manufacturing knitted neckwear at 317 Atlantic Ave.

*New York, Kinderhook. Henry Schnapper, formerly treasurer and buyer of the Kinderhook Knitting Co. and who recently disposed of his interests in that concern, has not completed details of his new mill project, but is making preparations to start a plant on lines similar to those manufactured by the Kinderhook Knitting Co., including sweaters, gloves and fancy knit goods.

North Dakota, Fargo. Quarters have been secured near the corner of Broadway and Front St. and machinery is in transit for a new knitting mill to be established here by M. E. Linke, who comes from Fergus Falls, Minn. The concern, which will probably do business under the name of the Red River Knitting Mills, will manufacture full-fashioned sweater coats for men, women and children, shawls, skirts, stockings and other knit goods.

*Pennsylvania, Philadelphia. The full fashioned knitting plant recently reported by us as about to be started in this city by Richard Schletter, formerly with the Lehigh Hosiery Co., and others, has been located at Ontario and I Sts., where they have leased the third floor of the Model Mills. The plant, which will contain 26 full fashioned frames, a portion of which have been delivered, will be operated under the name of the Brentmore Knitting Co., with Gustav Schiff of New York as president and Mr. Schletter, manager and superintendent. The main office is located in the Fifth Ave. building in New York City. The plant will be run on ladies' silk and cotton full fashioned hosiery which they will sell direct.

Pennsylvania, Philadelphia. The Edward A. Phillips Co. have leased the two upper floors in the building at the N. E. cor. of 2d and Market Sts., where they are installing 14 knitters and 5 sewing machines, on which they will manufacture a line of Shaker and sweater coats, bathing suits, etc., of woolen and worsted yarns. The production will be sold direct.

Pennsylvania, Philadelphia. Joseph Saftlas, formerly employed by the Royal Knitting Mills of this city, has installed an equipment at 918 South Bodine St. on which he is manufacturing knitted neckwear.

Tennessee, Nashville. It is reported that the Nashville Hosiery Mills, J. H. McPhail, president, manufacturers of children's hosiery, will establish a branch plant, Cookeville, Tenn., and Bridgeport, Ala., being the places mentioned as most likely to be chosen for the location.

*Virginia, Newport News. A building has been secured by the new Stewart Hosiery Mills, Inc., and alterations are being made to adapt it to the manufacture of hosiery. This company was recently incorporated with authorized capital stock of $100,000 by Harvey F. Stewart, who is president and treasurer, and J. H. LeConey, formerly of the Austin Knitting Mills, South Bethlehem, Pa., who is secretary and manager.

Enlargements and Improvements.

*Alabama, Fort Payne. The previously noted increase in equipment at the Florence Hosiery Mills, a branch of the Davis Hosiery Mills of Chattanooga, Tenn., consists of 30 new knitters and 12 new loopers. An automatic sprinkler system has also been contracted for.

*Georgia, Rossville. Good progress is being made on the work at the Richmond Hosiery Mills in changing the plant from steam to electric power, and within sixty days the machinery will be driven by power from the Oconee dam. The plant is being operated night and day at present.

Illinois, Belleville. Twelve more 220-needle hosiery machines have been ordered by the Belleville Hosiery Mills, manufacturers of mercerized and silk half hose, and they are also adding a bleaching department.

Indiana, Fort Wayne. According to report, the Wayne Knitting Mills have issued $100,000 of preferred stock to provide for the erection of a new building on a lot at the corner of John and Buchanan Sts., which has been held by the company for this purpose for some time. The building will cover the entire space, 120 bv 150 feet, and will be three stories in height, of brick fireproof construction, to cost about $35,000, and will be ready for operation next spring. It is understood that this is to be used only for the departments employing women exclusively. The company, of which T. F. Thieme is president, are manufacturers of full-fashioned and seamless cotton hosiery for men, women and children.

*Michigan, Adrian. Particulars of enlargements and improvements being made by the Adrian Knitting Co. are as follows: A new storehouse, 30 by 110 ft., has been constructed and they are at present equipping their bleach house, which is a brick building, for a capacity of 10,000 pounds daily with a continuous bleach system. The entire plant has been equipped this year with automatic sprinklers. About 300 people are employed in Adrian, turning out entirely children's underwear in two piece and union suits, and the company is enjoying an ever-increasing business.

Massachusetts, Malden. The Yale Knitting Co. are building a brick fireproof addition to their plant, 102 by 50 feet, which will practically double the company's production. The company reports an exceedingly good business, which has made the increase necessary.

*Massachusetts, Springfield. In the future the entire plant of the Russell Knitting Co. will be devoted to the manufacture of sweater coats, caps, toques and fancy knit goods specialties, and additional equipment for making these lines is to be installed. It has been noted that the glove and mitten equipment was sold to Wm. A. Bennett and removed to Holyoke.

Minnesota, Mankato. The Mankato Mills Co. is replacing a number of old machines with new German sweater machines.

*New York, Amsterdam. Contract for the construction work on the new buildings for the Chalmers Knitting Co. has been awarded to the B. F. Smith Construction Co. of Pawtucket, and the work of erection will be started soon, as the excavating is about completed. The new building for the shipping department at Gilliland Ave. and Bridge St. will be started first.

New York, Brooklyn. The Specialty Knit Goods Mfg. Co., 53 Hope St., who recently installed machinery for the manufacture of fine silk knitted neckwear, will install a finishing department.

New York, Brooklyn. The Atlantic Knitting Co., 94 Atlantic Ave., a concern which recently started up in the manufacture of knitted neckties with two knitters, is arranging for the installation of more machines, and also looking up knitting machines for the manufacture of scarfs, etc.

New York, Brooklyn. M. Gordon, manufacturer of surgical knit goods at 1076 Myrtle Ave., has recently purchased a number of new machines which he is now installing.

New York, Cohoes. The Putnam Knitting Co. is building an addition to the mill on Jackson Ave. and will increase the output. "Turknit" towels and wash cloths are manufactured. The concern also does custom bleaching of cloth in the roll and dyeing and coning thread and yarn.

*New York, Elmsford. The Berwin Knitting Mills, Bainbridge St. and Howard Ave., Brooklyn, have purchased a factory site at this place, on the Saw River. Engineers are making a survey of the property preparatory to building a mill and damming the river to develop power. It was previously reported that this company would build a mill at White Plains, which is three miles away.

*North Carolina, High Point. The addition to the local plant of the Durham Hosiery Mills, contract for which has been awarded, as noted, will be equipped with knitting machinery, although the company has not decided as yet upon the number to be purchased.

*North Carolina, Kernersville. The American Hosiery Mill Co. has been chartered under the general laws of North Carolina with authorized capital of $125,000, by J. A. Holleman of Jacksonville, Fla., and J. C. and Ora W. Kerner. This is to be a reorganization of the American Hosiery Mill, manufacturers of men's, women's and children's hosiery, whose plant was burned last April. At present the mill is being rebuilt, and it has been reported that 400 knitting machines for making their old lines will be installed, also dveing equipment and steam power plant.

*Pennsylvania, Allentown. The new plant of H. C. Bolich, who recently removed his machinery here from New Ringgold, Pa., is located at Sixth and Lehigh Sts., where machinery is being set up and other preparations made to begin manufacturing Sept. 1. There will be 12 body frames, 4 ribbers and 18 sewing machines, operated by electric power on ladies' ribbed underwear and union suits.

Pennsylvania, Philadelphia. Hensel Colladay & Co., 12th and Wood Sts., have increased their

knitting plant by the installation of a number of new upright knitting machines. They are manufacturers of dress, cloak and millinery trimmings, etc.

*Pennsylvania, Philadelphia. Louis H. Bartman & Co., 327 N. 8th St., formerly known as Bartman Bros. of 2d and Callowhill Sts., have recently installed six upright trimming knitting machines built by the John Eppler Machine Works of Philadelphia. They are manufacturing both knitted neckwear and millinery and dress trimmings.

Pennsylvania, Philadelphia. It is reported that Harry C. Aberle & Co., manufacturers of full fashioned hosiery at Third and Cumberland Sts., have had plans prepared for a new building to be located at A, Clearfield, Lippincott and Water Sts., to be 80 by 195 feet, four floors and basement of concrete and steel construction. The company will also install an electric plant for the purpose of supplying their own power.

Pennsylvania, Reading. Fifty new knitting machines for making half hose are being installed by the Hampden Knitting Mills Co., manufacturers of men's and women's seamless cotton, mercerized, lisle and silk hosiery. The company is reported as enjoying good business, with orders ahead for a year, the only difficulty experienced being the obtaining of sufficient help.

Pennsylvania, Reading. Plans are almost completed for a new mill for the H. V. Wentzel Knitting Mills in which nothing but ladies', misses' and children's underwear in vests, pants, shirts and union suits will be made. The machines will be 12 cut and finer and only better grades of goods in lisle, mercerized, silk and fine cotton will be made. This department will start with an equipment of at least 15 machines and possibly 25 machines and part of the equipment will be installed about August 10.

Pennsylvania, Reading. W. C. Bobst, manufacturer of seamless cotton half hose, 84-needle goods, at 215 Pearl St., is building a 2-story brick addition, 30 by 60 ft. The output is to be largely increased.

Pennsylvania, York. Extensive changes and improvements are being made by the Crystal Hosiery Mills with a view to modernizing the buildings and equipment and making a finer grade of goods. Ten new fine gauge machines are replacing ten old ones which have been taken out and sold, and a new six-compartment dyeing machine for developed black has been installed.

Rhode Island, Providence. A plot of land containing about 9,000 square feet has been purchased by the De Luxe Hosiery Co., and it is said that work on an additional factory building will be started soon. The new property acquired adjoins the present factory on Borden St., which is a five story mill.

*Tennessee, Nashville. The two-story addition to the plant of the May Hosiery Mills on which work was started in March, has been completed and adds 10,000 square feet of manufacturing space to the facilities of this company. It was noted in March that 78 new knitting machines for manufacturing ladies hosiery, a new line for this concern, would be installed, and this equipment as been received and set up.

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Mills Starting Up.

*Georgia, Cedartown. Some time will be required to put the old Cherokee Knitting Mill in shape for manufacturing and the new Waukesha Mills, which have taken over the property, will not be ready to begin manufacturing much before the middle of October. Lines of men's ribbed underwear and union suits will be made on equipment consisting at first of 12 knitting machines and 28 sewing machines, operated by electric power. Charter has been secured, with capital stock of $25,000. L. O. Benton is president, L. S. Ledbetter, vice-president, E. C. Benton, secretary and treasurer, and O. M. Whitbeck, manager and buyer. Graft Bros., New York, will be the selling agents.

*Illinois, Belleville. The new St. Clair Hosiery Mills Co. will begin manufacturing early in August. This company was incorporated in June with capital stock of $12,000 and has equipped a plant for making mercerized and silk fine gauge half hose, also to dye and finish the product. The officers are Philip Knapp, president; Peter Fellner, treasurer, and Curt J. Vogel, manager and buyer.

Pennsylvania, Auburn. The plant known as the Walborn Knitting Mills, formerly operated by Claude D. & J. A. Walborn, has been taken over by Philadelphia men and will be started up in three or four weeks, according to report. Citizens of Auburn are being invited to purchase stock and if sufficient capital is subscribed the plant will be operated on a larger scale than before. It has been shut down and offered for sale for some time. There are 12 knitting and 14 sewing machines which have been operated on women's ribbed underwear.

SILK.

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New Mills.

Connecticut, Rockville. It is reported that Julius H. Mueller, who has been connected for a number of years with concerns engaged in the manufacture of fish lines, will erect a building at 14-16 Morrison St. and establish a plant for the manufacture of silk braided goods. Work on the building will be started at once and machinery installed as soon as possible. P. C. Mueller will also be associated with the business.

Massachusetts, Lowell. The machinery of the Morton Mills of Paterson, N. J., is being shipped to Lowell, and some of the looms have already been set up in the No. 3 Mill of the Hamilton Mfg. Co., the whole of which will be occupied by the concern from Paterson. The entire business will be transferred to this city, and superintendent B. S. Clark is quoted as saying that they expect to have the new plant in full operation inside of three weeks. Only the overseers will be brought from Paterson and the balance of the 200 or 300 operatives to be employed will be hired in Lowell. The company manufactures silk and cotton narrow fabrics, most of the product being sold in New York.

New Publications

[Any work noticed under this head can be obtained through the office of this journal.]

The Weaving of Narrow Fabrics (Die Bandweberei), by Otto Both; 168 pages, 5 1/2 by 8 1/2; Dr. Max Jaenecke, Leipzig, Germany. Price $1.75.

The first edition of this work was published in 1907 and the first volume of the second edition has recently appeared. The work has been carefully revised and much new material added, including a large number of excellent illustrations of narrow fabrics. The entire first volume is devoted to weave and weave effects. It is illustrated with 314 weave drafts and 95 illustrations of narrow fabrics. Presumably the second volume will cover the other subjects included in the first volume, such as machinery for warp preparation and weaving, the processes of drawing-in and reeding, and ribbon calculation. Owing to the lack of books dealing with narrow fabrics an English translation of this book would be a valuable service to the narrow fabric industry.

The Chemistry and Practice of Finishing, by Percy Bean, F. C. S., M. Ph. S., and William McCleary, F. C. S.; 2 vols., 822 pages, 5 1/2 by 8 1/2; Lord & Nagle Co., Boston, Mass. Price $15.

A second edition of this valuable work has been published in order to meet the continued demand for it. New material has been added to bring the book up to date. The first volume, which is devoted to bleaching and finishing, treats of the subject under the following heads: Part 1. 1, Chemicals employed in bleaching; 2, The physical and chemical properties of cotton and linen; 3, Bleaching cotton and linen piece goods; 4, Bleaching cotton goods woven with colored borders; 5, Stains and faults in cloth due to imperfect bleaching; 6, Water and purification of water for bleaching; 7, Machinery used in bleaching. Part 2. 1, Adhesive and thickening substances used in finishing; 2, Materials used for giving weight to fabrics; 3, Ingredients used to soften the fabric; 4, Deliquescent substances used for softening and weighting fabrics; 5, Ingredients used for preserving fabrics from mildew; 6, Colors used for tinting the cloth and the filling; 7, Substances used for rendering fabrics fireproof; 8, The practical finishing of cotton piece goods. Part 3. 1, Making-up and packing machinery; 2, Soft and finished patterns of cloth; 3, The analysis of finished cloth. The second volume contains ninety-six white, dyed and printed goods with recipes and directions for finishing.

Rubber Trade Directory of the World; 313 pages, 6 by 9; The India Rubber Publishing Co., 15 West 38th St., New York. Price $3.50.

The 1912 edition of this directory covers the rubber trade in a very complete manner. It contains a list of trade organizations, rubber goods factories, rubber plantations, exporters and dealers in rubber, reclaimers, manufacturers and dealers in ingredients and substitutes, rubber machinery, cotton fabrics for rubberizing, chemists, engineers, manufacturers of technical instruments and wholesale distributers of foot wear. There are also lists of crude rubber exporters in Central and South America. The rubber goods factories and rubber dealers in the principal foreign countries are also included. The directory includes valuable information on the duties of foreign corporations and state laws affecting corporations.

Hendricks' Commercial Register of the United States; S. E. Hendricks Co., 74 Lafayette St., New York City; 1,574 pages. Price $10.

The twenty-first annual revised edition of this directory for buyers and sellers has been issued. It furnishes classified lists of manufacturers in architectural, engineering, electrical, mechanical, railroad, mining, manufacturing and kindred trades and professions. There are over fifty thousand classifications in this book so arranged that it can be used for either purchasing or mailing purposes. Nearly six thousand new headings have been added to current edition which were not included in any previous edition. All manufacturers in a particular line of trade are classified under a general heading for mailing purposes and then subdivided according to the variety of their special products.

BUSINESS LITERATURE

A Handsome Power Transmission; James Hunter Machine Company, of North Adams and Boston, Mass.

The above well known manufacturers of textile machinery, have issued an attractive catalogue describing their power transmission machinery. The catalogue is of the loose leaf type and each hanger, pillow block, friction clutch, etc., is presented on a full page bulletin with accompanying diagram giving all dimensions, rendering it extremely valuable to an engineer or master mechanic in designing space for the installation of this class of work. While the Hunter friction clutches have for many years had an almost world wide vogue, it is perhaps not so well appreciated in the textile trade, as in other branches of manufactures. A copy will be sent on application. A specialty is made of sending competent engineers on request, to look over any special power transmission problems, Jas. Hunter Machine Co. at all times being glad to submit sketches and propositions for the furnishing of this class of work.

The Revolvator; by the N. Y. Revolving Portable Elevator Co., Jersey City, N. J.

Bulletin 15, describing the advantages of the revolving base feature in their portable tiering machine, are illustrated by a series of pictures showing the progressive operations necessary in stacking material. A second publication issued by the same company, "The Revolvator and What is Said About It," gives the opinions of a number of different classes of users, showing why this tiering machine with a revolving base has

been profitable to them. Many of the letters tell how much money the Revolvator has saved per month, and how many men it has replaced in their storerooms. Copies of these two books may be had by addressing the N. Y. Revolving Portable Elevator Co., 346-352 Garfield Ave., Jersey City, N. J.

The Economy Steam Turbine; The Kerr Turbine Co., Wellsville, N. Y.

Bulletin No. 26 illustrating and describing the Economy Steam Turbine has just been issued by the above firm. Photographs of actual installations are shown, interesting steam consumption curves are given and size comparisons are made. A free copy will be mailed to anyone interested.

Industrial Notes

CHANGE OF NAME

The following notice has been sent to the trade:

New York, Sept. 1, 1912.

Gentlemen:—For the purpose of more closely identifying this company with the Farbwerke vormals Meister, Lucius & Bruening, of Hoechst-on-the-Main, Germany, whose agents we and our immediate predecessors have been, for nearly forty years, we have with their permission, decided to change the name of this corporation to Farbwerke-Hoechst Company.

The products and processes of the "Hoechst" works are known throughout the world and only in the United States and Canada has their name not been officially connected with them.

The officers and management of the company remain the same, and no change other than in name takes place. The Supreme Court of the State of New York has authorized the change, which becomes effective after this date.

We hope for a continuance of your good-will and thank you for the many favors extended to us in the past.

Yours very truly,
H. A. Metz & Co.,
H. A. Metz, President.

LOUIS HIRSCH

Louis Hirsch, the well known and highly successful agent for full fashioned hosiery machines, takes this opportunity to thank his many friends and customers for their support in the past and hopes that their relations will continue in the same friendly spirit in the future. On account of the merger of H. Alban Ludwig with Schubert & Salzer, Mr. Hirsch has been compelled to sever his connection with the former firm, after succeeding in introducing their machines and creating a large and fast growing business for them in the United States. He is now in Europe to make final arrangements for new connections. Mr. Hirsch is expected back here within a few weeks and will continue business at the old address, 260 West Broadway, New York.

A GOOD RECORD

Covering 886 miles, hauling 192 tons, consuming 254 gallons of gasoline and 21 gallons of oil, that was last month's record of a two-ton Kissel-Kar truck used by the Chester Brewing Company of Chester, Pa. The company considers this an exceptionally fine showing, considering that more than 70 per cent. of the roads traversed are up grade.

"EUROPEAN FINISH NO. 7"

The Arabol Mfg. Co., 100 William St., New York City, recommend highly their "European Finish No. 7" for cotton, worsted and union goods, as giving excellent results in the padding machine, and exceptionally full feel. It is odorless and far superior to glue.

THE NIAGARA THREAD CO.

One of the most important manufacturing concerns in Philadelphia operating upon an independent basis, is that which has become widely known as the Niagara Thread Co., 120-122-124 S. American St., at the head of which are gentlemen who have been engaged in thread manufacturing for years and are familiar with it in all its phases. The Niagara mills are equipped with the latest machinery and appliances for the manufacture of sewing threads of all colors for general manufacturing purposes, a specialty being made of thread suited for underwear and knit goods, which require a high quality of thread. Another specialty of the Niagara Co. is the mercerized thread, made for the cutting-up trades, including manufacturers of cloaks and suits, who require the threads in all colors and shades, in the form of spools, tubes and cones. The mercerized cotton is a standard product. The company's facilities are such that any description and size of special thread can be made and supplied manufacturers at but a slight increase in price. The high quality of the products of the Niagara Thread Co. is due, not only to the high grade of raw material, but also to its proper dyeing and the careful supervision of every process of manufacture. The increase in the business has been so rapid that the company will before long fully double their present facilities. Their trade covers the entire country.

FIRE UNDER AUTOMATIC SPRINKLERS

The report of the Boston Manufacturing Mutual Fire Insurance Co. for June shows a total of 74 fires in the selected risks which this company insures. The total fire loss in the 63 cases where the property was protected by automatic sprinklers was $11,013, or an average of $175 per fire. In the 11 cases where the property was not protected by automatic sprinklers the losses aggregated $41,131, or an average of $3,739 per fire. The ratio shows that the average loss where there were no sprinklers was more than 21 times the loss where sprinklers were installed. In one of the cases without sprinklers, contract for same had been let, but they had not yet been put in.

HESS-BRIGHT MANUFACTURING COMPANY'S NEW OFFICE

The above named company are now occupying their new factory at Front St. and Erie Ave., Philadelphia. The new location affords ground and floor space for much needed expansion, and we expect that with the aid of the new facilities they will be able to care for their customers' requirements even more effectively than in the past. The new factory embodies the very latest ideas in modern factory construction and arrangements.

COST OF COAL

In figuring the cost of operation of a steam power plant for a large cotton mill in New England, Lockwood, Greene & Co., architects and engineers for industrial plants, Boston, has recently placed the cost of coal at just 75 per cent. of the total direct operating cost, exclusive of capital charges. The figures given for one year's operation are as follows: Coal, $32,985, labor, $6,893; oil, waste and supplies, $4,100, making a total of $43,978.

COMPARATIVE COST OF STEAM GENERATED AND PURCHASED POWER

In a recent study of this subject Lockwood, Greene & Co., architects and engineers for industrial plants, Boston, determined for a large cotton mill a cost of $21 per h. p. year at the switchboard for a steam operated plant as against $27.48 for purchased power, the cost of current being quoted at 1.3 cents per k. w. hour. In both cases the figures include complete capital charges and operating costs throughout the year, including coal for banked fires over nights, Sundays and holidays. A further comparison showed that for equality in cost, it would be necessary to buy the current at 9.85 mills per k. w. hour.

THE EASTERN MAINE OVERSEERS

The annual meeting of the Eastern Maine Woolen Overseers Association was held at Bangor, Me., Saturday, August 24. There was a large attendance. The members assembled at the Bangor House where a special car was taken for Riverside Park. The business session was called to order at 11.30 A. M. The business consisted of the reading of reports, election of officers and other business transactions. Following the meeting a clam bake was enjoyed by the members.

The officers elected were as follows: A. A. Burkhardt, Skowhegan, Me., president; George McRea, No. Vassalboro, Me., first vice-president; Herman Waterhouse, Sangerville, Me., second vice-president; A. T. Spaulding, Dover, Me., secretary; L. C. Sawyer, Dover, Me., treasurer.

The afternoon was given up to sports, consisting of a tug of war, 100-yard dash, 100-yard hurdle race, high jumping, shot putting and a three legged race. There were several prizes given to the contestants. The sports were greatly enjoyed by all present.

MOTOR TRUCKS BEING USED BY TEXTILE MILLS

A considerable number of textile mills are using motor trucks instead of horse-drawn vehicles and new converts to this modern means of trucking are continually being added to the list. The Kissel Motor Car Company of Hartford, Wis., have sold one of their two-ton Kissel Kar trucks to the Waupun, Wis., mill of the Paramount Knitting Company of Chicago.

STEAM HOSIERY BOARDS

W. D. Butz, sole selling agent of Ermentrouts Steam Heated Hose Boards, with offices at 625 Bourse Bldg., Philadelphia, reports the installation of this system of drying hosiery without the use of dry boxes and wooden boards in the following mills: McCallum Hosiery Co., Tonner & Moyer, Rambo & Regar, Catawissa Knitting Mills, Bangor Silk Knitting Co., Paramount Knitting Co., H. A. Romberger, S. S. Miller, Rick Knitting Co., H. W. Sheeler, W. G. Leininger and the Burson Knitting Co. A number of these concerns after trying out this method of drying their hosiery and finding it successful, have forwarded repeat orders, while others have equipped their plant throughout and report the operation of the boards as beyond their anticipation. Mr. Butz has many other orders entered which are being filled as rapidly as possible.

THE ENGLISH WOOLEN INDUSTRY

From Consul Benjamin F. Chase, Leeds

State Insurance for Heavy Woolen District. Some firms in the heavy woolen section of this district have made the provisions of the national insurance act (in force July 15, 1912, and briefly described in Daily Consular and Trade Reports for July 19) a basis for an increase of wages sufficient to cover all or part of the laborers' share of the contribution.

A syndicate (Extract Wool and Merino, Ltd.) of five firms (Hirst & Son, Britannia Mills, Birstall; Fitton & Sons, Pildacre Mills, Dewsbury; Jessop Bros., Springfield Mills, and E. Townend, Healy Road, Ossett; Lee Nephew & Sons, Ravensthorpe) shoddy and mungo manufacturers and wool extractors, has decided to form an approved society under the provisions of the act and to pay the laborers' contribution while remaining in their employ. This payment will be made even though the employe does not join the new society. The clerical work will be performed by the syndicate's chartered accountants. No part of the management will be conducted in their mills. Alderman Hirst of the first-named firm says that by this society their workers will reap the advantage of the low sick rate which results from the strict attention paid to sanitation, cleanliness, and ventilation at the mills of the various firms in the combine. In defense of the increase of wages proposed by paying the workers share of the contribution without deduction from the wage that—

"The (Government) Board of Trade returns . . . show that the cost of living has increased 25 per

cent. since 1896, and although wages have been advanced the workers are relatively worse off than they were 15 years ago."

Another firm of woolen manufacturers at Batley is forming an approved society for the work people of its mill—over 1,400 persons—and will pay one-half of the workers' weekly contribution and in addition £5 ($24.33) as a death benefit for those who die while in their employ. This firm has a profit-sharing scheme, heretofore described in Daily Consular and Trade Reports for March 30, 1911.

The insurance act has been severely criticised by a portion of the press and by many individuals who will reap its benefits.

The action of the firms named shows that the act has already aroused some healthy interest in the condition and welfare of the employes. Time alone will tell if it is to be the panacea promised by its advocates. The firms named have provisions in their organizations which prevent any interference with the freedom of the worker to change his employment without loss of benefits accrued. Most employers intend collecting the weekly contribution from the employe by a deduction from the existing wage. This is compulsory under the act unless organizations such as named are formed.

Yorkshire Rag Trade Notes. Reports from Dewsbury state that every branch of industry in the heavy woolen district is fully employed, many mills working overtime. Though the trade with Japan has fallen off as compared with a year ago, there has been increased business with China. It is also stated that manufacturers are producing fabrics of higher quality. A Batley firm making heavy woolens, etc., and employing nearly 1,500 persons, is having plans prepared for extensive additions.

There has been a remarkable reduction in the imports of rags. In May only 4,000 tons were received (the normal imports being about 5,000 tons), of which about 1,000 tons were from the United States.

A serious difficulty as arisen for the rag merchants owing to the decision of the railway companies (which by working agreements have reduced competition for custom to a minimum) to charge a higher rate for storage of rags. Very low charges on a space basis have of late years been made by the companies and the result has been great accumulations in their stores. The new charges will be on a weight basis, 4d. (8 cents) per ton per week, increased to 6d. (12 cents) per ton if the rags remain in the stores over six months. This scale entails such a great increase in the cost of storage that large quantities of rags have been brought into the salesrooms, and as the manufacturers who can store large quantities of rags on their own premises are comparatively few, this said to have a depressing influence on prices except for those kinds in demand for immediate use.

The Walcott & Campbell Spinning Co., New York Mills, N. Y., will soon improve the power equipment of its mills by the installation of a 500-kv-a Curtis Turbo-generator to be excited by a 14 k. w. motor generator set. This unit has been ordered from the General Electric Company.

A THREEPENNY BIT AT LAWRENCE, MASS.

The only time I felt really at home (writes a correspondent) during my recent tour in America was when I found myself in a wool-sorting room in one of the mills in Lawrence (Mass.). The smell was familiar, the scene was familiar, even the talk seemed strangely familiar, and presently I realized that many of the men, though they had lived and worked in Lawrence many years had preserved a remnant of their native Yorkshire speech and accent. Among the scrape of conversation I heard the words "nowt," "gawmless," "sitha," "anent," and customary oath, "By gow!" One man near me, I found, came from Saltaire, and by a coincidence he was sorting English wool. There were in it bits of heather and bracken, grown, no doubt, on Yorkshire moors. As I was looking on, feeling a sort of comfortable home-sickness, a man beside me called out: "By gow, Fred! I've fun' a thrip'ny bit! I don't think I've seen one for fifteen year!" The wonderful coin was passed round for inspection, and then returned to the finder, who spat on it for luck, and pocketed it with as much care as if it had been a diamond. Who had lost it, and was it ever missed? At least it is safe to say that the owner would not have grudged his loss if he could have seen the delight it gave to these Yorkshiremen abroad.—The Yorkshire Observer.

South Carolina, Welford. The Tucapan Mills are about to add new electrical apparatus to their power plant consisting of one 900 k. v.-a. generator, one 15-k. w. exciter, three 900 k. v.-a. and three 750 k. v.-a. transformers and switchboard. This equipment is being frunished by the General Electric Company.

A CONCENTRATED SYSTEM OF LIGHTING

The Hinsdill Electric Company, Troy, N. Y., is meeting with a great deal of success with a universal adjustable fixture with special lamp and shade, by means of which operatives at sewing or other machines can concentrate the light exactly where needed in their work, preventing the glare of the light from affecting the eyes. In other words, all of the light is projected onto the work instead of being diffused and wasted.

Aside from saving the operatives' eyes and giving better light exactly where needed, this system, according to the manufacturers' claims, saves a great deal in lighting expenses, as many lights of comparatively small candle power can be used for each operative.

Among the many users of these lights are the United Shirt and Collar Company, Earle & Wilson Collar Company, and the Swansdown Knitting Company.

Since the death of Mr. Arthur Merritt who died June 12, this year, the old firm which was for many years located at Custom House St., Boston, is now known as The Merritt Dyestuff & Chemical Co., and with offices at 184 Summer St. They are manufacturers and dealers in dyewood and tannin extracts, aniline colors, gums, etc.

Recent Textile Patents

BRAIDING MACHINE. 1,034,688. Hermann Buscher, Langerfeld, Germany.

CARDING MACHINERY Comb Mechanism. 1,034,782. George F. Geb, Franklin, Mass.

CHENILLE FABRIC. 1,034,671. Charles B. Young, New York.

DYEING APPARATUS. 1,033,584. Lucien P. Hart, Philadelphia, Pa.

DYEING MACHINE, Pressure. 1,034,487. Farquharson J. Muir, Winchester, Mass.

EMBROIDERING MACHINE Driving and Stop Mechanism. 1,034,759. Gustave L. Bourquin, Camden, N. J.

FABRIC, Apparatus for Conditioning Adhesive-Coated. 1,035,218. James Meade, Stoughton, Mass.

FABRIC, Woven. 1,033,843. William G. Trautvetter, Paterson, N. J.

FABRICS, Machine for Curling the Pile of Textile. 1,033,459. Fred Pearson, Downingtown, Pa.

FIBER BLEACHING and Treating, Flax. 1,034,195. Frank E. Burgess, Columbiaville, Mich.

JACQUARD MECHANISM. 1,033,888. Joseph A. Groebli, New York.

KNITTING MACHINE. 1,034,346. George E. Cottrell, Northfield, Vt.

KNITTING MACHINE. 1,034,032. Albert M. Pigeon, Providence, R. I.

KNITTING MACHINE. 1,034,521. Robert D. Scott, Leeds Point, N. J.

KNITTING MACHINE. 1,035,656. Harry Swinglehurst, Philadelphia, Pa.

KNITTED FABRIC. 1,035,751. Robert W. Scott, Leeds Point, N. J.

KNITTED WEBS, Improving the Texture of. 1,035,031. Joseph D. Morley, Utica, N. Y.

KNITTING MACHINE, Circular. 1,034,665. Everett H. Walker, Lowell, Mass.

KNITTING MACHINE Needle. 1,035,752. Robert W. Scott, Leeds Point, N. J.

KNITTING MACHINE, Straight. 1,033,723. Karl Nebel, New York.

KNITTING MACHINES, Yarn Supplying Device for. 1,035,657. Harry Swinglehurst, Philadelphia, Pa.

KNITTED WEBS, Machine for Running on. 1,035,081. Walter D. Butz, Norristown, Pa.

LOOM. 1,034,631. William J. Lutton, Paterson, N. J.

LOOM. 1,035,114. Henry Cote, W. Warren, Mass.

LOOM PICKER Mechanism. 1,034,433. John F. Dustin, Fulton, N. Y.

LOOM THREAD-PARTING Mechanism. 1,035,213. William McCaslin, Hopedale, Mass.

LOOM for Weaving Tufted Fabrics. 1,033,589. George F. Hutchins, Worcester, Mass.

LOOM STOP Motion. 1,034,275. Henry J. Miller, Boston, Mass.

LOOM SHUTTLE Check. 1,033,263. Jonas Northrop, Hopedale, Mass.

LOOM TAKE-UP Mechanism. 1,035,808. Jonas Northrop, Hopedale, Mass.

LOOM SHEDDING Mechanism, Leno. 1,033,507. William P. Wood, Pawtucket, R. I.

LOOM ATTACHMENT. 1,034,363. August E. Halvorsen, Philadelphia, Pa.

LOOMS, Wage-Registering Apparatus for Power. 1,034,920. Samuel Marschik, Bruen, Austria-Hungary.

LOOM. 1,035,353. George H. Jones, Greenville, S. C.

LOOM Filling-Thread Cutting Mechanism, Weft-Replenishing. 1,034,932. Eppa H. Ryon, Waltham, Mass.

SHUTTLE. 1,033,516. Robert N. Allen, Methuen, Mass.

SHUTTLE. 1,035,792. Gottfried Hoffmann, College Point, N. J.

SPINNING RING Holder, Rotary. 1,034,790. Bicknell Hall, Taunton, Mass.

TEXTILE MATERIAL, Apparatus for Conditioning. 1,035,925. Isaac E. Palmer, Middletown, Conn.

THREAD, Manufacturing Artificial. 1,034,235. Josef Hermans, Hanover, Germany.

THREAD HOLDING Device. 1,035,559. Everiste J. Durand, Cheboygan, Mich.

WARPING MACHINE. 1,033,363. John Warburton, Paterson, N. J.

WARPING MACHINES, Combined Yarn Guiding, Clearing and Tension Device for. 1,034,775. Louis Fessmann, Augsburg, Germany.

RECENT TEXTILE TRADE MARKS REGISTERED

64,191. Knitted Underwear. Mark: The Orchid. Owner: Lindeke Warner & Sons, St. Paul, Minn.

63,796. Cotton Piece Goods. Mark: Tasco. Owner: T. A. Shaw & Co., Chicago, Ill.

63,822. Hosiery. Mark: Home-Run. Owner: E. M. Townsend & Co., New York.

64,038. Zephyr Gingham. Mark: Velvo. Owner: G. A. Stafford & Co., New York.

64,215. Cotton Duck in the Piece. Mark: Anco. Owner: John H. Meyer & Co., New York.

64,307. Handkerchiefs. Mark: Fairfax. Owner: Carson, Pirie, Scott & Co., Chicago, Ill.

63,921. Cotton Piece Goods. Mark: Altonah. Owner: Suffern & Co., New York.